

Sundstrand Corporation



CORPORATE OFFICES • 4949 HARRISON AVENUE, P.O. BOX 7003 • ROCKFORD, ILLINOIS 61125-7003 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 25 7440



March 15, 1991

CERTIFIED MAIL/
RETURN RECEIPT REQUESTED

RECEIVED
MAR 19 1991

Ms. Karen Vendl
U.S. EPA - Region V (5HS-11)
230 S. Dearborn St.
Chicago, IL 60604

REMEDIATION &
ENFORCEMENT
RESPONSE BRANCH

Re: Supplemental Response
Southeast Rockford Groundwater
Superfund Site (the "Site")

Dear Ms. Vendl:

This letter is written in response to the questions which you raised during our November 29, 1990 meeting with respect to Sundstrand's CERCLA 104(e) Response dated July 24, 1990 to the EPA's Supplemental Request for Information dated June 20, 1990. The following points are numbered in accordance with the EPA Supplemental Request for Information dated June 20, 1990. Each item consists of Sundstrand's explanation and additional facts, if any.

This submittal is prepared for the purpose of further explaining the responses which Sundstrand submitted last July. Sundstrand does not believe that a supplement to the Supplemental Response for Information pursuant to Section 104(e) is relevant in this situation with the exception of Question No. 5 which references spills or releases. This response is being revised to the extent additional information has been discovered during the course of our inquiries to prepare this letter of clarification. Nothing in this Supplemental Response should be construed as an admission of liability.

Question No. 5 - you asked whether additional spills took place at the 4747 Harrison Avenue, Plant 6 location. Attachments 3 through 5 provided the responses for Question No. 5. They contain information describing applicable reportable quantity spills as defined by CERCLA and any spills reportable under other federal statutes, for example, the underground storage tank regulations.

FAX OF THIS
LETTER RECEIVED
3/15/91 @ 4:45pm. KAV

Ms. Karen Vendl
March 15, 1991
Page -2-

A. Specifically, Attachment 5 submits all documented spill releases accurately with one exception. The 1986 Coole letter to the USEPA indicated a potential source for releases as the 3 underground storage tanks inside the Plant 6 facility. The tanks were pulled in the third and fourth quarters of 1986. Two of the three tanks were discovered to have holes, yet product remained in them at the time of their removal. These tanks had been inactive for some time prior to their removal.

Also attached is a summary of a history of suspected releases for the purpose of submitting the Plant 6 Soil Pile Closure Plan. (See Question 7 C). Note that these events do not necessarily fall under any requirements to notify as a spill or release, however, in the interest of full cooperation, we are submitting them to you.

B. You also inquired with respect to Sundstrand's relationship with Suntec. Suntec is the current owner of the business at 2210 Harrison Avenue as reported in our July, 1990 response. In 1980 or 1981, a waste oil tank overflowed. The IEPA was notified at that time. This spill at Suntec is the only documented spill available to us. Please remember that the employees at Suntec are not Sundstrand employees, and thus we do not have access to them to inquire with respect to spills since 1984, when we sold the business to Suntec. In addition, as the IEPA is well aware, there is an ongoing investigation at Suntec with periodic sampling of groundwater. A certain area most likely associated with overflow of tanks was determined to have some concentrations of solvents present. A vacuum extraction system is currently being used at this facility. This activity is contracted by Suntec, a portion of which will be reimbursed by Sundstrand because of a contractual obligation at the time of the sale of the business.

C. Attachment 4 is a listing of contacts with the IEPA from 1976 through 1981. This was provided because certain spills are recorded. This documentation is the only remaining record available on these matters.

D. Additionally, you asked about the nature of the JP-4 or jet fuel used at Plant 1 and 2. JP-4 is a kerosene-like material which is highly volatile. A copy of an MSDS for JP-4 is being forwarded to you under separate cover. You also inquired with respect to naptha and mineral spirits. Further documentation on these two materials is also being sent separately.

E. You also inquired with respect to evaluating soils related to potential leaking tanks and other areas within Plant 6. At the time the 3 tanks inside Plant 6 were removed in 1986, soil sampling was performed so as to characterize the soils for disposal purposes. We are currently searching for the documentation on soil analysis. Given the tanks' position under the building, it was determined that as much of the soils should be removed from the area as possible and the hole closed so as to prevent further migration of the materials. 98 drums of soils were removed for disposal.

Suspected Program Test Area (PTA) trenches were steam cleaned and relined with a special epoxy sealant. Soil samples were not taken, given the uncertainty of migration of small volumes of materials into any partial cracks in the trenches.

The soils surrounding the waste sump and associated piping are being addressed in the Soil Pile Closure Plan submitted to the IEPA.

F. With respect to the June, 1990 spill at 4747 Harrison Avenue, information has been sent to the IEPA and a sampling program was proposed and has been implemented. Those results are being reviewed and a report is currently being written by Harding Lawson Associates. This report will be submitted upon its completion to the IEPA in Springfield as directed by the IEPA.

Question No. 7 - Attachment 6.

A. You requested a copy of EDI's final report for Plant 6 which is attached.

B. Attachments 8 and 9 originally provided reports completed to date and additional materials on the soil gas survey are provided herein. Also included is the copy of Geraghty & Miller's proposal to conduct the vacuum extraction soil remediation program.

C. Finally you asked whether Sundstrand had any plans to evaluate the soils in Plant 6 which may have been affected by leaking underground storage tanks or from other areas. Sundstrand submitted a closure plan on March 7, 1991 to the IEPA which addresses the treatment and disposition of soils containing concentrations of materials resulting from underground storage tanks in the Plant 6 tank farm.



SOUTHEAST ROCKFORD SITE
RESPONSE TO REQUEST FOR INFORMATION
SUNDSTRAND CORPORATION, ROCKFORD, ILLINOIS

1. DID YOU EVER USE, PURCHASE, GENERATE, STORE, TREAT, DISPOSE, TRANSPORT OR OTHERWISE HANDLE ANY MATERIALS AT THE SITE. If YOUR ANSWER TO THIS QUESTION IS ANYTHING BUT AN UNEQUIVOCAL NO, ANSWER THE FOLLOWING QUESTIONS:

a. IDENTIFY THE CHEMICAL COMPOSITION, CHARACTERISTICS, PHYSICAL STATE (E.G., SOLID, LIQUID), AND TRADE OR CHEMICAL NAME OF EACH MATERIAL.

Selected Material Safety Data Sheets (MSDS's) are provided as Attachment 1 to this response. Out of the thousands of MSDS's for materials which Sundstrand uses at its plants, we have provided the major categories of materials which may be classified as hazardous. Because of the sheer volume of MSDS's which are responsive to this request, we will make our MSDS's available for your examination at your convenience during business hours.

b. STATE WHETHER ANY OF THESE MATERIALS WERE OR CONTAINED "HAZARDOUS SUBSTANCES" AS DEFINED BY CERCLA SECTION 101(14), 42 U.S.C. SECTION 9601(14).

The following materials used at the various Rockford plants are or contain "hazardous substances" as defined by CERCLA Section 101(14), 42 U.S.C. Section 9601(14): 1-1-1 Trichloroethane, Perchloroethylene, Stoddard Solvent, some waste oils containing greater than 1% solvents.

c. IDENTIFY BY NAMES, BUSINESS ASSOCIATION, LAST KNOWN ADDRESS AND TELEPHONE NUMBER, THE PERSON WHO SUPPLIED YOU WITH EACH SUCH MATERIAL DISPOSED OR OTHERWISE HANDLED BY YOU.

See Material Safety Data Sheets in Attachment 1 and response to request 1.a.

d. STATE HOW SUCH MATERIALS WERE USED, PURCHASED, GENERATED, STORED, TREATED, TRANSPORTED, DISPOSED OF OR OTHERWISE HANDLED BY YOU.

Sundstrand owns four storage sheds located at 1400 Harrison Avenue. Surrounding the storage sheds is a chain link fence around which weeds and grass grow. During certain periods, a mixture of commercial weed killer, waste oil, and occasionally, 1-1-1 Trichloroethane or Perchloroethylene could have been used to kill the weeds on this property.

e. STATE WHEN SUCH MATERIALS WERE USED, PURCHASED, GENERATED, STORED, TRANSPORTED, DISPOSED OF OR OTHERWISE HANDLED BY YOU.

From approximately 1962 to 1972, a commercial weed killer could have been mixed with waste oil and sprayed or poured on the ground underneath the fence in order to kill weeds. In the mid-70's a commercial weed killer alone was applied. With respect to 1979 and 1980, one employee recollects the infrequent use of still bottoms to kill weeds. Still bottoms are used 1-1-1 Trichloroethane which is periodically removed from the recycling still and consists of approximately 60% waste oil and 40% 1-1-1 Trichloroethane. These still bottoms may have been diluted further with waste oil. From 1980 to the present, a commercial weed killer has been used exclusively.

f. STATE WHERE SUCH MATERIALS WERE USED, PURCHASED, GENERATED, STORED, TREATED, TRANSPORTED, DISPOSED OF OR OTHERWISE HANDLED BY YOU.

See response to 1.d. above.

g. IDENTIFY THE QUANTITY OF SUCH MATERIALS USED, PURCHASED, GENERATED, STORED, TREATED, TRANSPORTED, DISPOSED OF OR OTHERWISE HANDLED BY YOU.

From 1962 to 1972 only one application was made per season to kill weeds. Approximately 55 gallons of the mixture was used per application. The mixture may have contained approximately 70 - 75% oil, 24 - 29% solvent, and 1 - 4% weed killer, or 95 - 99% oil and 1 - 4% weed killer. In the mid-70's the amounts of commercial weed killer used are unknown. During 1979 through the fall of 1980, approximately 15 to 20 gallons of still bottoms were used per year.

2. DESCRIBE THE NATURE OF THE MANUFACTURING AND MAINTENANCE PROCESSES AT YOUR OPERATION(S) FROM 1982 TO 1987, INCLUDING:

a. A DESCRIPTION OF ALL MATERIALS PURCHASED FOR USE IN YOUR OPERATION(S) INCLUDING THE SUPPLIER, CHEMICAL IDENTITY AND CHEMICAL COMPOSITION OF ALL MATERIALS IDENTIFIED.

See response to 1.a. above and Attachment 1.

b. A DESCRIPTION OF ALL MANUFACTURING PROCESSES THAT GENERATED ANY BY-PRODUCTS OR WASTES.

See Attachment 2.

c. A DESCRIPTION OF ALL MAINTENANCE OPERATION(S) THAT GENERATED ANY BY-PRODUCTS OR WASTES.

See Attachment 2.

d. A DESCRIPTION OF ALL PRODUCTS, BY-PRODUCTS AND WASTES GENERATED.

See Attachment 2.

3. HAVE YOU OR ANY OTHER PERSON EVER ACCEPTED MATERIALS FOR TRANSPORTATION TO THE SITE FROM ANY PERSON?

Sundstrand did not accept materials for transportation to the Southeast Rockford Site from any person.

4. IDENTIFY ALL PERSONS, INCLUDING YOURSELF, WHO MAY HAVE ARRANGED FOR DISPOSAL OR TREATMENT OR ARRANGED FOR TRANSPORTATION FOR DISPOSAL OR TREATMENT OF MATERIALS AT OR TO THE SITE.

See Response to Request 1 above. All information obtained has been the result of extensive interviews with current and former employees. The material which could have been applied was for the purpose of killing weeds, not to provide a means of disposal.

5. PROVIDE COPIES OF ALL CONTRACTS, SHIPPING DOCUMENTS, OR OTHER BUSINESS DOCUMENTS INCLUDING RECEIPTS RELATING TO THE TRANSPORTATION, STORAGE AND/OR DISPOSAL OF WASTE MATERIALS AT THE REFERENCED SITE.

Sundstrand has no documents or records in its possession relating to the transportation, storage and/or disposal of waste materials at the Southeast Rockford Site.

6. IDENTIFY ALL LIABILITY INSURANCE POLICIES HELD BY RESPONDENT FROM 1982 TO THE PRESENT. IN IDENTIFYING SUCH POLICIES, STATE:

a. THE NAME AND ADDRESS OF EACH INSURER AND OF THE INSURED.

b. THE AMOUNT OF COVERAGE UNDER EACH POLICY.

c. THE COMMENCEMENT AND EXPIRATION DATES FOR EACH POLICY.

<u>Name & Address</u>	<u>Limits</u>	<u>Year*</u>
Insurance Co. of North America Philadelphia, PA.	Range of \$1M-\$5M	1984 to 1987
Pacific Employers (CIGNA GROUP) New York, New York	Range of \$1M-\$5M	1985 to 1987
International Insurance Co. Chicago, IL.	\$20M \$2M	1984 to 1985 1986 to 1987
Aetna Casualty & Surety Hartford, Conn.	Range of \$2.5M-\$25M	1984 to 1987
Constitution State Ins. Co. (Travelers Group) Hartford, Conn.	\$2.5M	1987
United Insurance Co. Caymen Islands	\$2M	1986
Scottsdale Insurance Co. Scottsdale, AZ.	\$3.25M	4/1/86 to 12/31/86
Renflo International Ltd. (Captive Insurer) Bermuda	Range of \$2M-\$95M	1982 to 1987
Various Claims Made Policies	Range of \$2.5-\$75M	1986 to 1987

*Data for 1988 and 1989 will be supplied upon their receipt.

d. WHETHER OR NOT THE POLICY CONTAINS A
"POLLUTION EXCLUSION" CLAUSE.

e. WHETHER OR NOT THE POLICY COVERS SUDDEN,
NONSUDDEN OR BOTH TYPES OF ACCIDENTS.

All of the comprehensive general liability insurance policies contain pollution exclusion clauses which include an exclusion of all environmental pollution with the exception of sudden and accidental occurrences. None of our carriers have, to date, accepted liability for environmental claims, and all of those notified have requested further information subject to a reservation of rights.

7. PROVIDE COPIES OF ALL INCOME TAX RETURNS SENT TO THE FEDERAL INTERNAL REVENUE SERVICE IN THE LAST FIVE YEARS.

Copies of income tax returns are available for examination in the Sundstrand corporate offices at 4949 Harrison Avenue. Each annual filing consists of approximately 1500 to 2000 pages.

8. PROVIDE ALL FINANCIAL STATEMENTS FOR THE PAST FIVE FISCAL YEARS, INCLUDING BUT NOT LIMITED TO THOSE FILED WITH THE FEDERAL AND STATE INTERNAL REVENUE SERVICE AND SECURITIES AND EXCHANGE COMMISSION.

See Sundstrand annual reports from 1984 through 1988 and Sundstrand 10K and 10Q filings from 1984 to 1988 - Attachment 3.

9. IDENTIFY ALL OF RESPONDENT'S CURRENT ASSETS AND LIABILITIES AND THE PERSON(S) WHO CURRENTLY OWN OR ARE RESPONSIBLE FOR SUCH ASSETS AND LIABILITIES.

See Sundstrand annual reports from 1984 through 1988 and Sundstrand 10K and 10Q filings from 1984 to 1988 - Attachment 3.

10. IDENTIFY ALL SUBSIDIARIES AND PARENT CORPORATIONS OF RESPONDENT.

See Attachment 4.

11. PROVIDE A COPY OF THE MOST CURRENT ARTICLES OF INCORPORATION AND BY-LAWS OF RESPONDENT.

See Articles of Incorporation - Attachment 5.
See Sundstrand By-Laws - Attachment 6.

12. IDENTIFY THE MANAGERS AND MAJORITY SHAREHOLDERS OF RESPONDENT AND THE NATURE OF THEIR MANAGEMENT DUTIES OR AMOUNT OF SHARES HELD, RESPECTIVELY.

No shareholder owns more than 10% of the shares outstanding. See attachment 3.
See Sundstrand Proxy Statement - Attachment 7.



ATTACHMENT 1

List of documents previously submitted to the USEPA:

1. Results of Hydrogeologic Evaluation for Sundstrand Corporation, August, 1989, Project 20557, submitted on July 24, 1990 and on March 15, 1990.
2. HLA Work Plan and Report, October 25, 1989, Attachment No. 9, in July 24, 1990 Response.

TABLE OF EXHIBITS

A(c)1 Map of Sundstrand Rockford locations

A(c)2 Map of Harrison/Alpine locations

A(e)1 Office memorandum dated June 24, 1987 from Al Munn and attached June 24, 1989 letter to IEPA and Sundstrand Advanced Technology Group (ATG) letter dated August 31, 1990 to Kerry Keller (IEPA)

A(e)2 IEPA letter dated May 15, 1985 to Bill Coole

A(e)3 Sequence of Events - August 30, 1984 to December 19, 1984

A(e)4 Sundstrand Corporation letter dated July 24, 1985 to IEPA from William R. Coole

B(b)1 Sundstrand letter dated April 4, 1985 to USEPA from Bill Coole; Sundstrand letter dated March 20, 1985 to the IEPA from Bill Coole

B(e)1 Plant 6 Water and Soil Contamination Investigation - Source Elimination Proposal - Prepared by Al Munn dated August 27, 1986

B(e)2 CBC-AquaSearch Laboratory Report dated June 26, 1986

C(c)1 Overhead photograph South of Plant 8 (#119930-3)

E(e)1 Sundstrand ATG letter dated August 3, 1990 to IEPA from Al Munn

G(e)1 Memo dated September 2, 1983 to Leonard Grunow from Owen Briles

H(e)1 Sanitary District of Rockford Accidental Discharge Reporting Form

I(e)1 Office memorandum dated April 6, 1987 to Jim Barry from Jeff Lindstrom

J(e)1 Soil Pile Schedule of Events

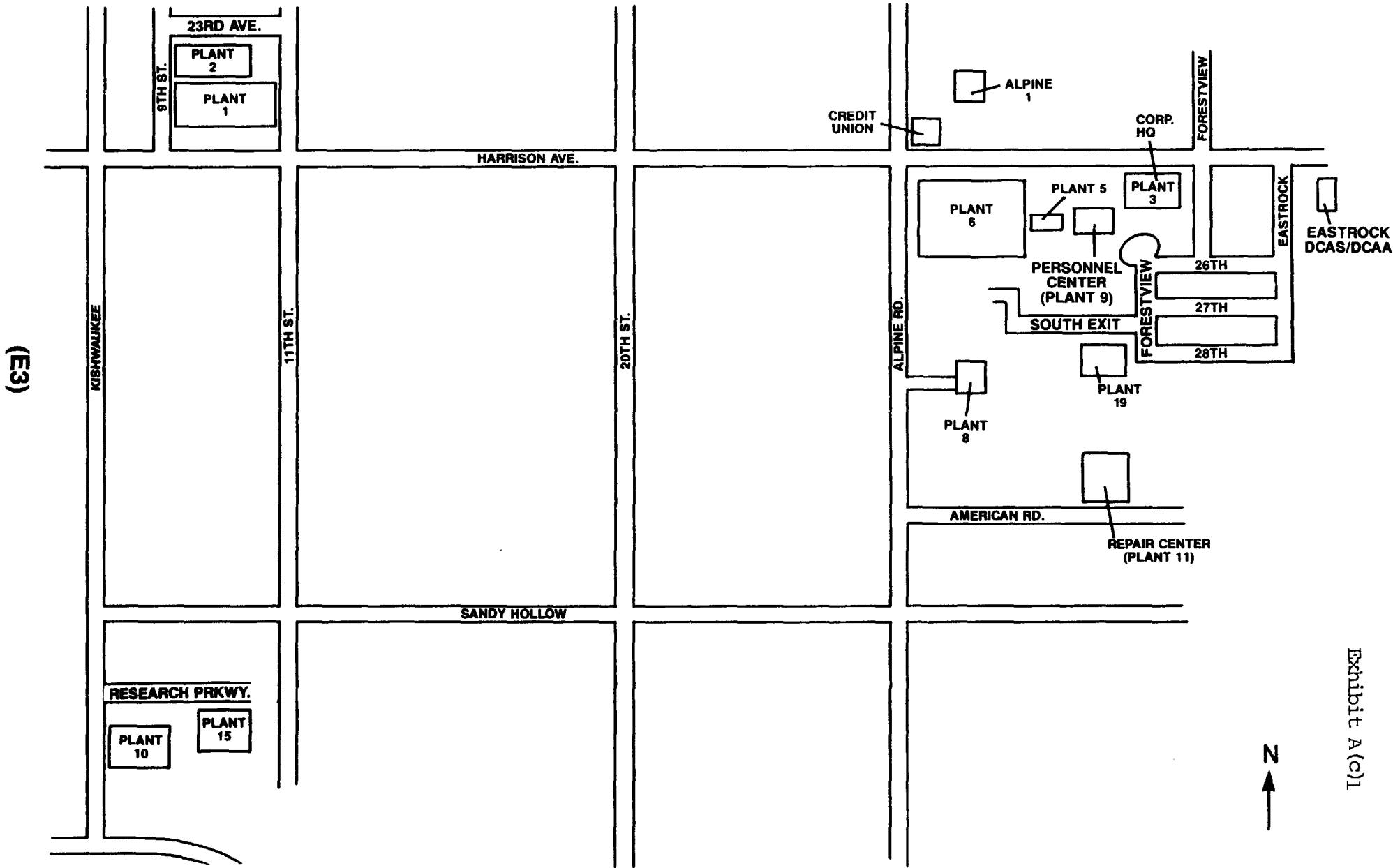
J(e)2 HLA Closure Plan (Plant 6 Soil Pile) Sundstrand Project No. 5-8255

J(e)3 HLA Summary Report Plant 6 Facility Tank Farm Area Investigation

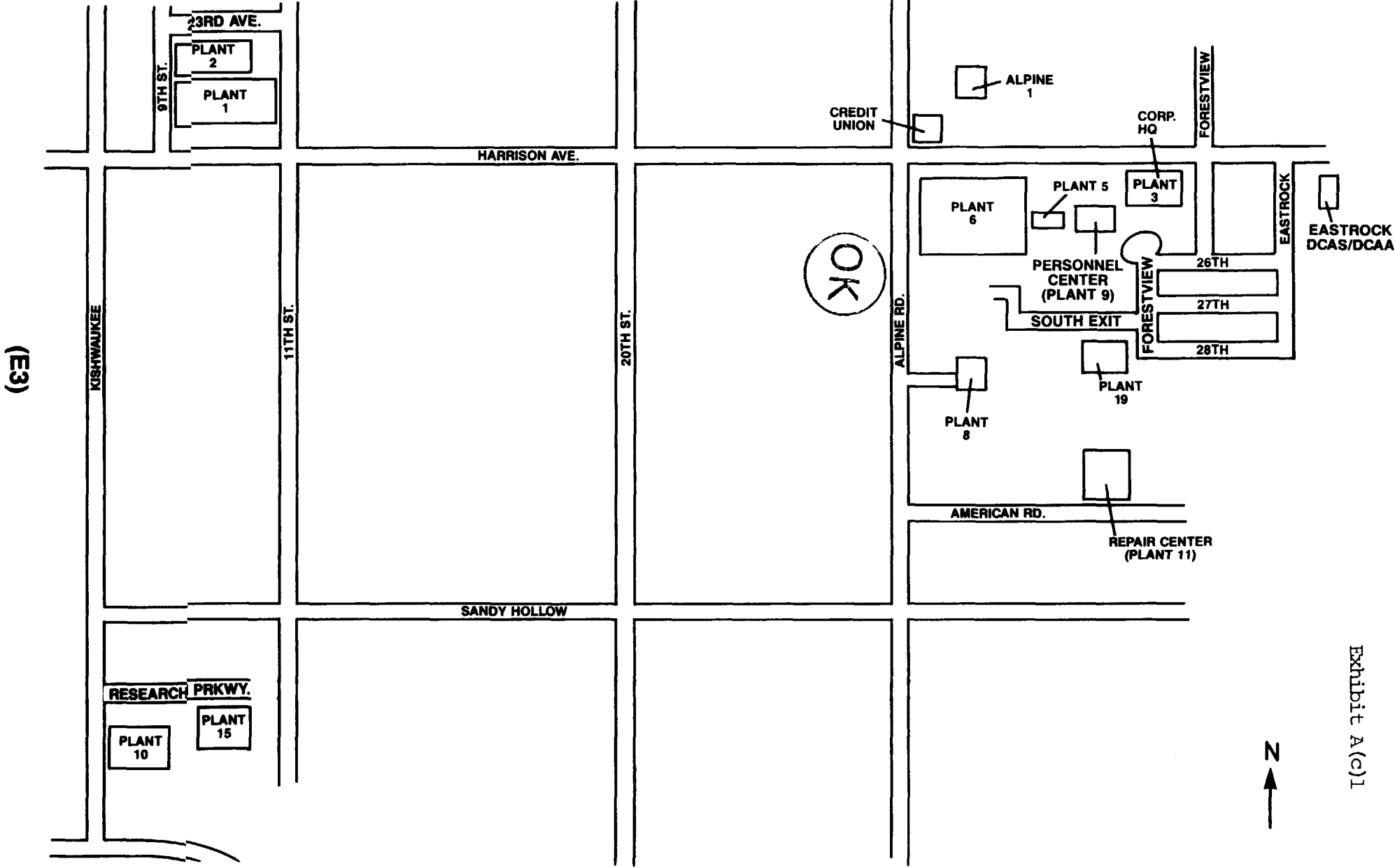
J(e)4 Sundstrand ATG letter dated July 14, 1990 to IEPA from Al Munn

- K(e)1 Sundstrand ATG letter dated August 31, 1990 to IEPA from Al Munn
- O(e)1 Hazardous Materials Incident Report dated June 29, 1989
- Q(e)1 Sanitary District of Rockford Accidental Discharge Reporting Form

Sundstrand Rockford Locations



Sundstrand Rockford Locations



LAST FILE = 30 AUG 1988 GROUP = OFFP USER = OFFICE DRAWID = ISITE ALL
 DATE = 8/30/88 TIME = 15.29 SCALE = 0.0150
 DRAWING PLOTTED BY USED REVISED MADE

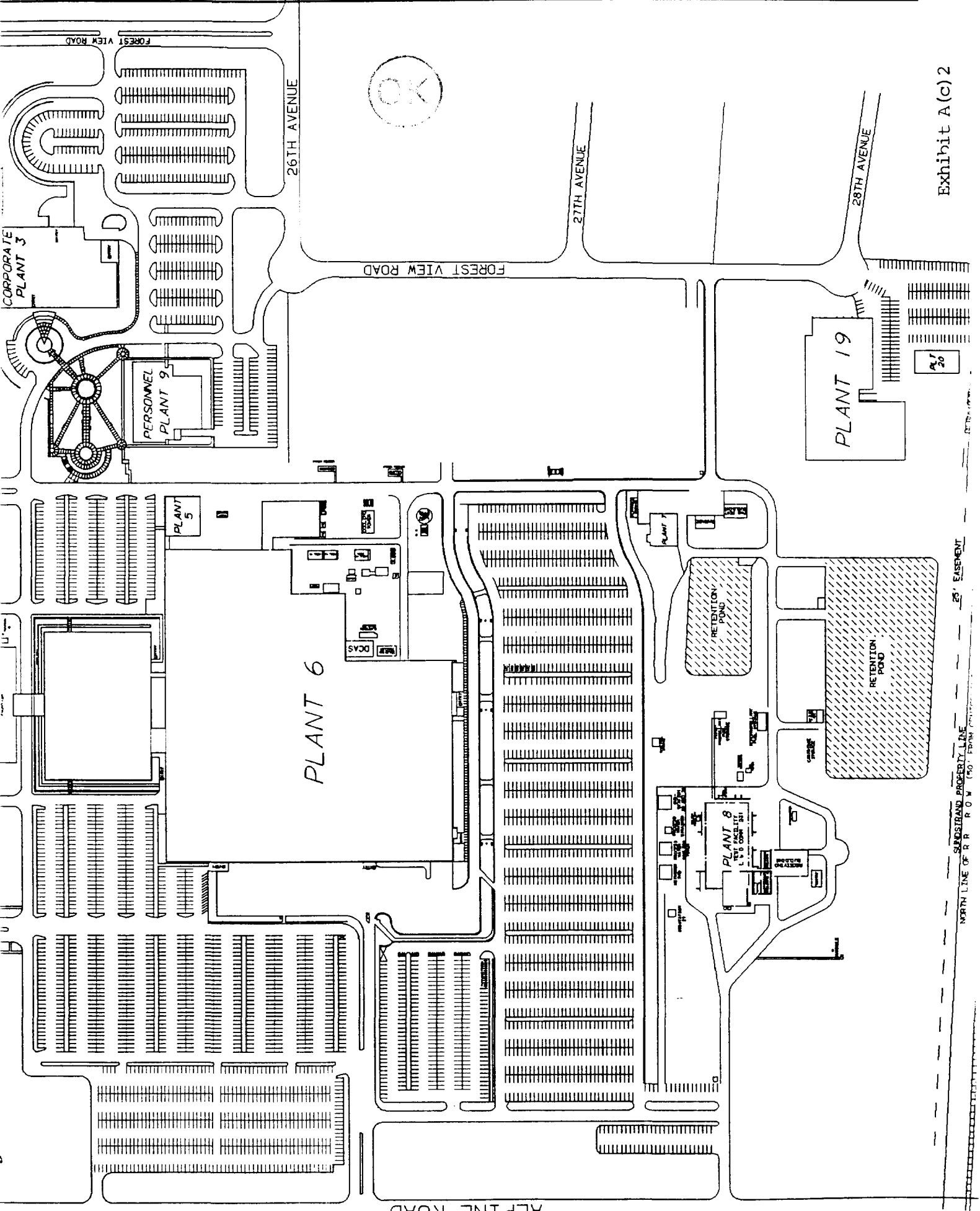


Exhibit A(c)2

Sundstrand Advanced Technology Group

Sundstrand Corporation



4747 HARRISON AVENUE, P.O. BOX 7002 • ROCKFORD, ILLINOIS 61125-7002 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 25-7440

August 31, 1990
EPA90-092

Mr. Kerry Keller
Illinois Environmental Protection Agency
Division of Land Pollution Control
4302 North Main Street
Rockford, IL 61103

RE: 2010300038 - Winnebago County
Sundstrand Corporation -
Aviation Division

Dear Mr. Keller:

On the following pages, please find the annual report for the Toluene Remedial Action Program at our 4747 Harrison Avenue, Rockford, Illinois, location. This report covers a period from August 1988 to December 1989.

The air stripping tower continues to be effective in removing the toluene contamination. An average monthly flow through the tower of 1,512,000 gallons of water is being successfully treated at a greater than 99.9% efficiency rate as depicted in the attached graph (Attachments 1 and 2). The average monthly flow rate was established by calculating an average 35 gpm and multiplying it out over a 30 day month.

The monitoring well sample data also lends credence to the fact that our remedial action program is working. These results are also summarized in the attached graphs (Attachments 3 through 6).

The detox system was shut down for November and December of 1989 due to a build-up of scale on the tower media. This build-up effected the efficiency of the tower as can be seen in the October results in the Attachments 1 and 2. January, 1990 results of sampling indicate a combined influent toluene level of 4900 ug/l and an effluent level of less than 1.0 ug/l.

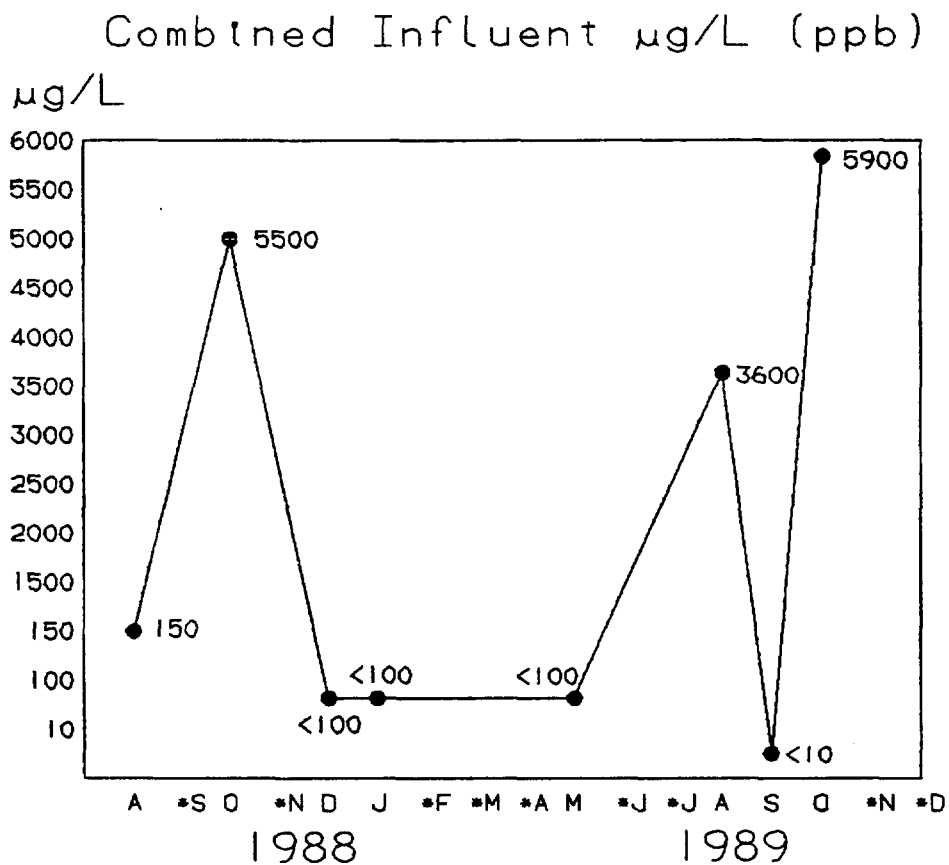
If you have any questions, please feel free to call me at 815/226-6934.

Sincerely,

Al Munn
Environmental, Health
and Safety Manager

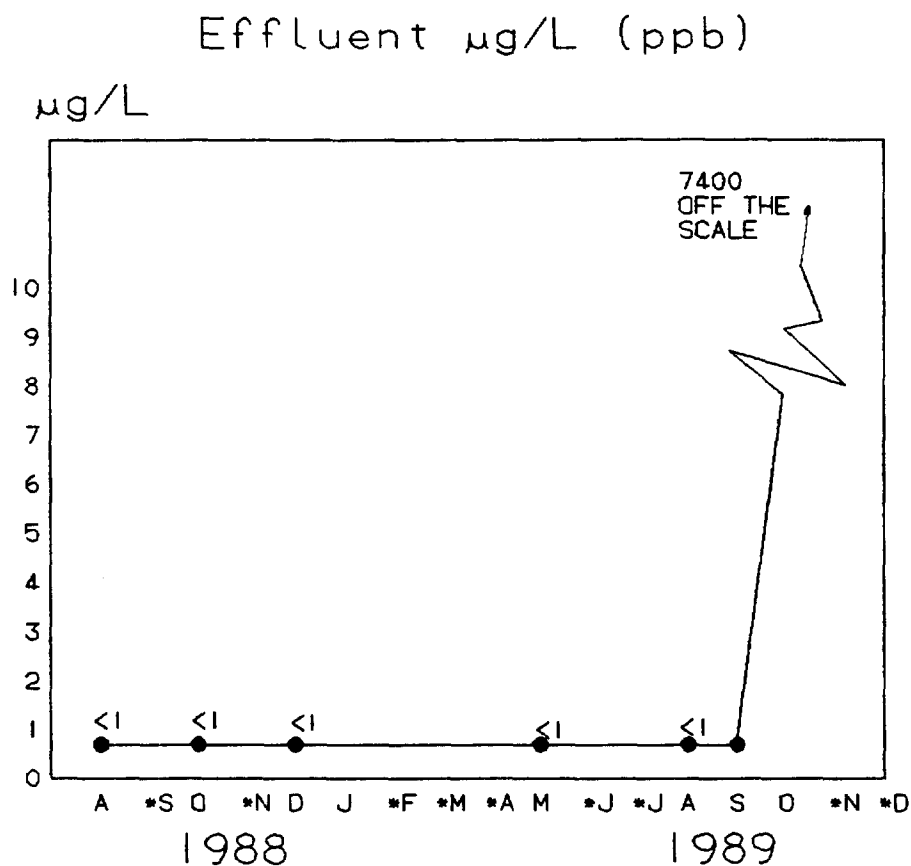
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Attachments

AIR STRIPPING TOWER PERFORMANCE 'TOLUENE'



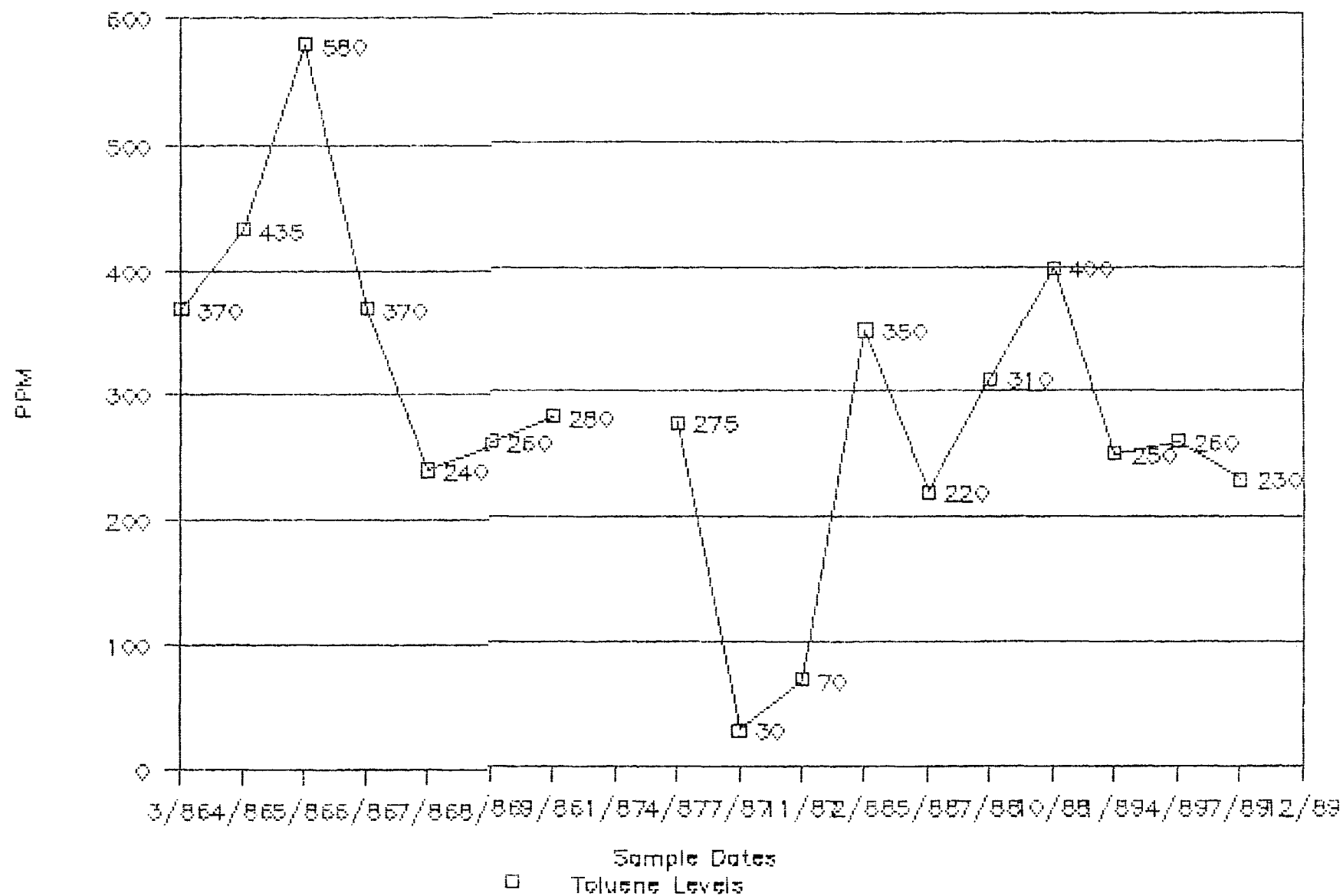
* = NO SAMPLES TAKEN FOR THAT MONTH

AIR STRIPPING TOWER PERFORMANCE 'TOLUENE'

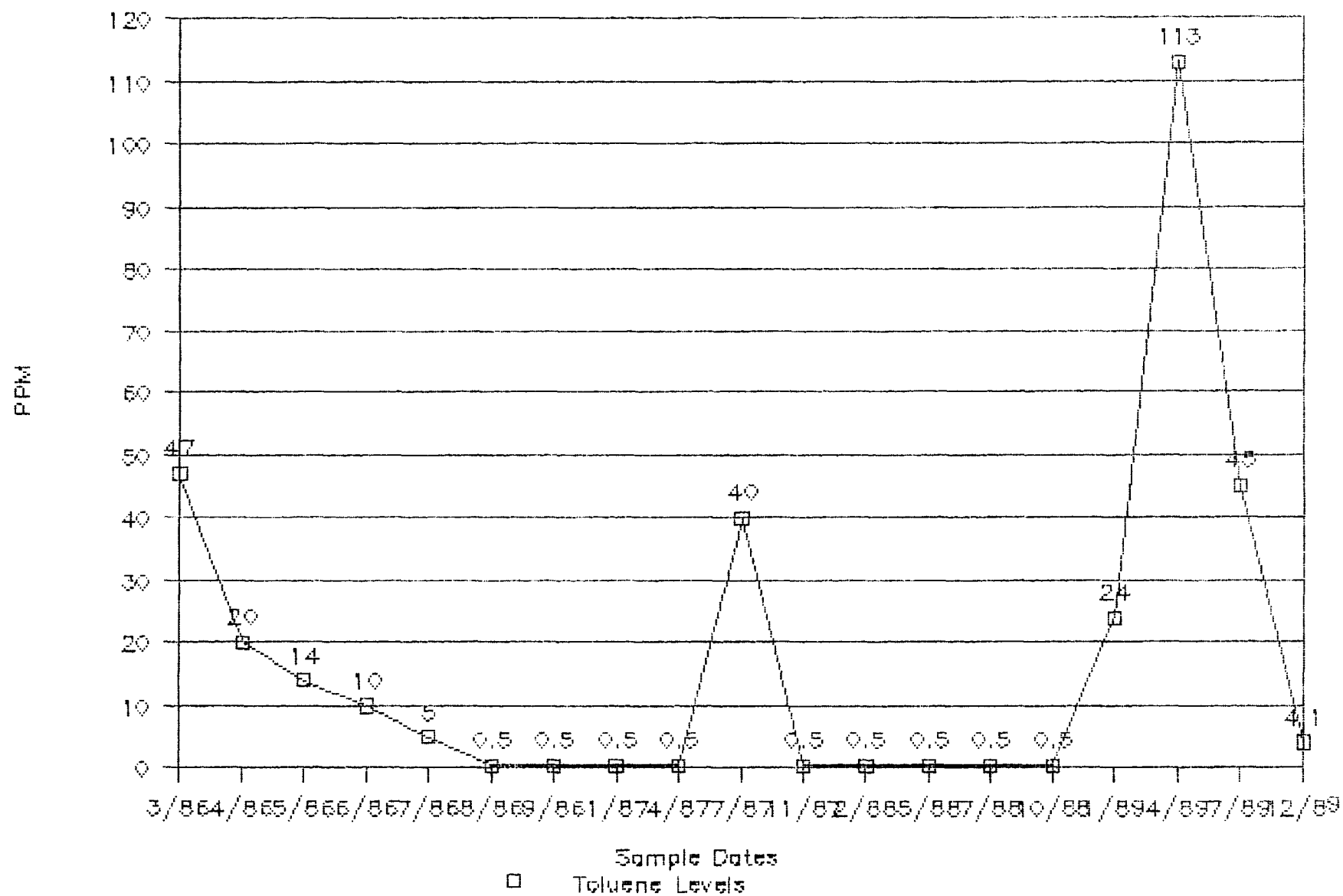


* = NO SAMPLES TAKEN FOR THAT MONTH

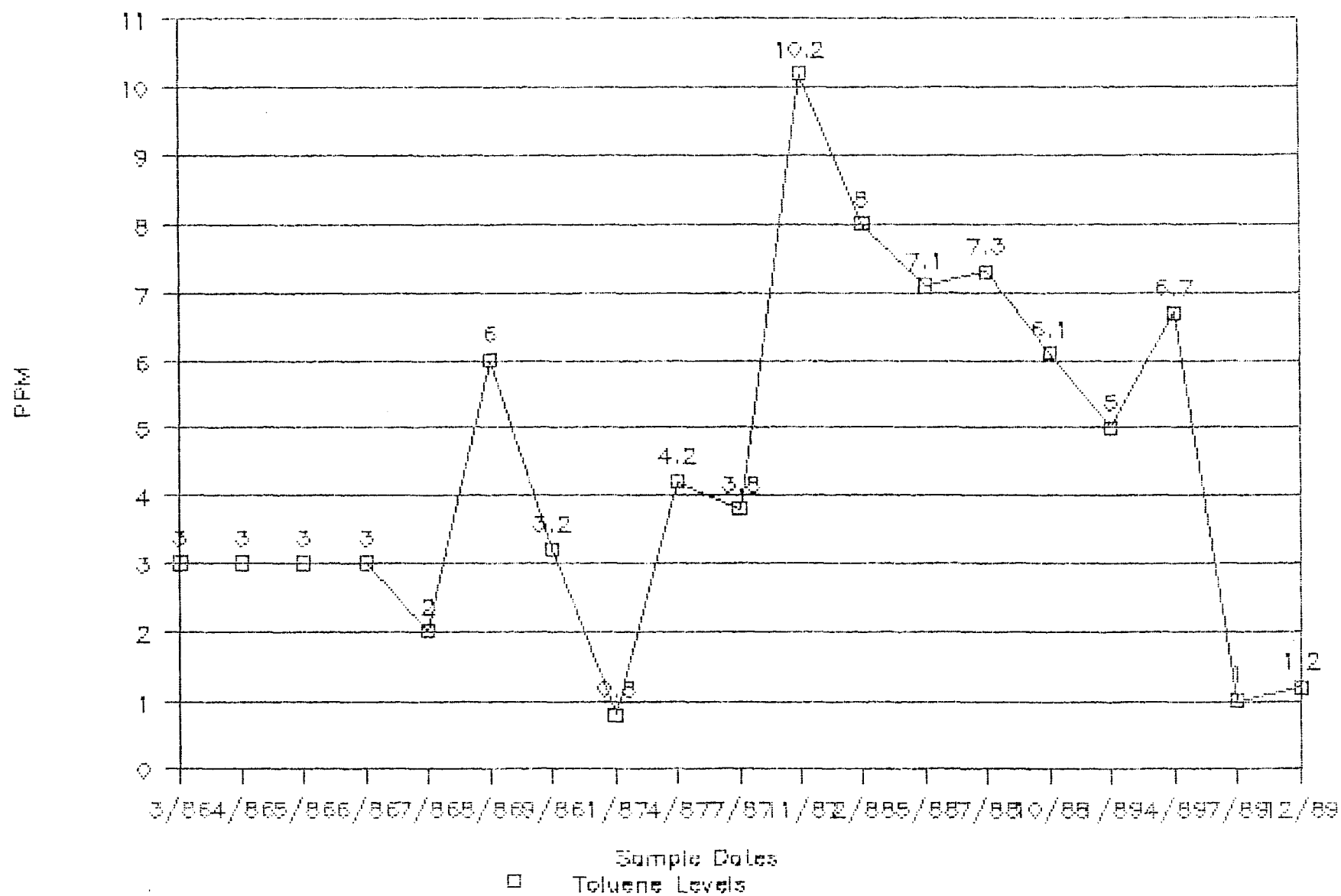
MW-4A Toluene Levels



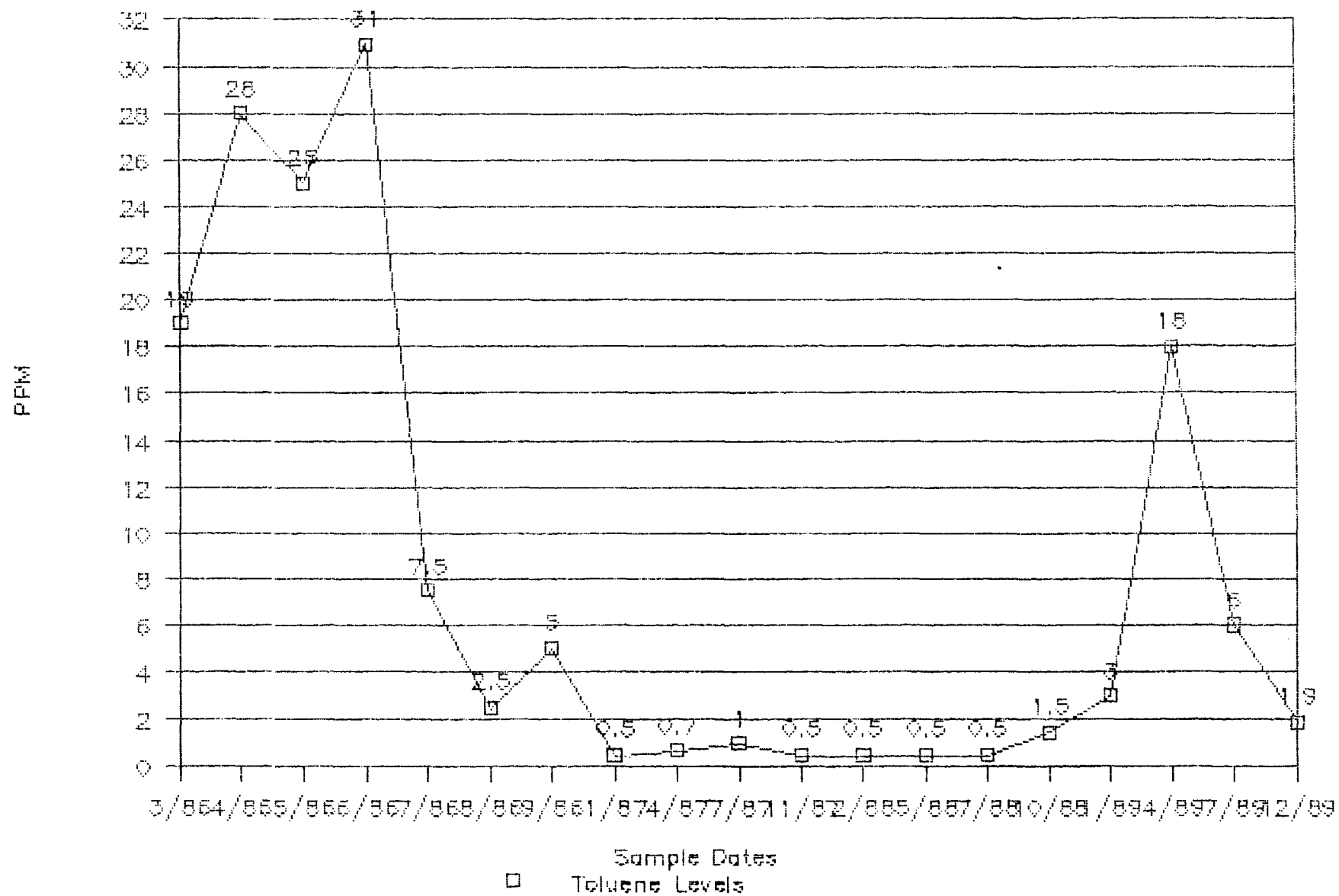
MW-5 Toluene Levels



MW-15 Toluene Levels



MW-24 Toluene Levels



RECEIVED JUN 29 1987

Exhibit A(e)1

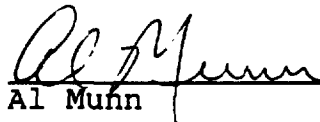
OFFICE MEMORANDUM

Date: June 24, 1987

Ref: EPA87-026

TO: Jay Fernandes
Bill Coole
Larry Myers
Harold Christiansen
Mark Chiado
Curt Rosser

FROM:


Al Munn

SUBJECT: Aqua Detox Annual Report

Enclosed, please find an annual report from Fehr-Graham on the first year operation of the Aqua Detox Tower. As you will read, the tower seems to be working satisfactorily in controlling and reducing the levels of toluene in the groundwater.

I have submitted this report on the first year of operation to the IEPA. Upon receipt, they have expressed an interest in coming in and discussing it with us as well as see how we are doing on the overall plant six project.

If you have any questions or comments, please let me know.

AM/jw

Sundstrand Aviation Operations

unit of Sundstrand Corporation



4747 HARRISON AVENUE, P.O. BOX 7002 • ROCKFORD, ILLINOIS 61125-7002 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 257-440

June 24, 1987
EPA87-033

Mr. Steve Colantino
Illinois Environmental Protection Agency
Division of Land Pollution Control
2200 Churchill Road
Springfield, Illinois 62706

Reference: 2010300038 -- Winnebago County
Sundstrand Corporation - Aviation Division
Superfund/Technical Report

Dear Mr. Colantino:

Enclosed, please find a copy of the 1st annual report pertaining to the first year operation of the Toluene Remedial Action Program at our 4747 Harrison Avenue, Rockford, Illinois location.

Please review this report and should you have any questions or require additional information, please call either myself at (815) 226-6934 or Mr. Bill Coole at (815) 226-6303.

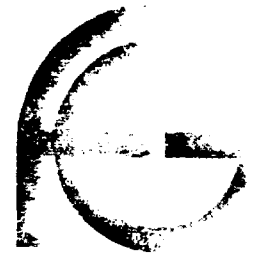
Sincerely,

Al Munn
Supervisor ATG Loss Control

AM/jw
Enclosure
cc: Kerry Keller
IEPA Rockford

Allen E. Fehr
Joseph G. Graham
Erwin D. Toerber
Quentin H. Davis
Mark K. Young

660 W. Stephenson Street
Freeport, Illinois 61032
815/235-7643



FEHR-GRAHAM
& ASSOCIATES
Engineering and Science
Consultants

May 18, 1987

Mr. Al Munn
Sundstrand Corp.
P.O. Box 7002
4751 Harrison Ave.
Rockford, IL 61125

Dear Al:

This report details the effectiveness of the Toluene Remedial Action Program at Sundstrand's facility located at 4751 Harrison Avenue, Rockford, Illinois, after one full year of operation as indicated by monitor well sampling results. These results are summarized in the attached graphs and sample result sheets. The location of the monitoring wells are shown on the attached map.

The system has shown itself to be a very effective remedial activity during the first year of operation. Only two monitoring wells are currently showing levels of toluene contamination greater than drinking water standards--MW15 and MW4A.

MW4A is located adjacent to the area where the release occurred and is probably receiving toluene which is desorbing from the soil. The fact that MW4A is continuing to show high levels of contamination tends to lead to the conclusion that the flushing system, which is operating within 10 feet of MW4A, is purging the soil of contamination, and through this action is keeping the concentrations high in this well.

MW4A was not sampled in January as it had apparently been hit by a vehicle and bent. By April, the well had been repaired enough to sample with a bailer.

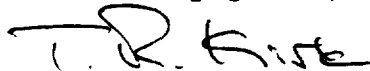
MW24 and MW5 are continuing to show decreasing levels of contamination from the time of the last report, which contained data through the first six months of the remedial action program. These wells had been strongly impacted by toluene concentrations prior to start up and have shown excellent response to cleanup activities since that time. The downgradient wells, MW26 and MW10, have shown no evidence of toluene contamination adding to our assurance that the spreading of toluene contamination has been arrested by the remedial action being taken.

May 18, 1987
Mr. Al Munn
Page 2

The calculated radii of influence of the two pumping wells are shown on the attached map. The wells are continuing to pump at a combined 25 gpm with PW1 pumping 20 gpm and PW2 pumping 5 gpm. The flushing system is currently operating at a rate of approximately 1.5 gpm.

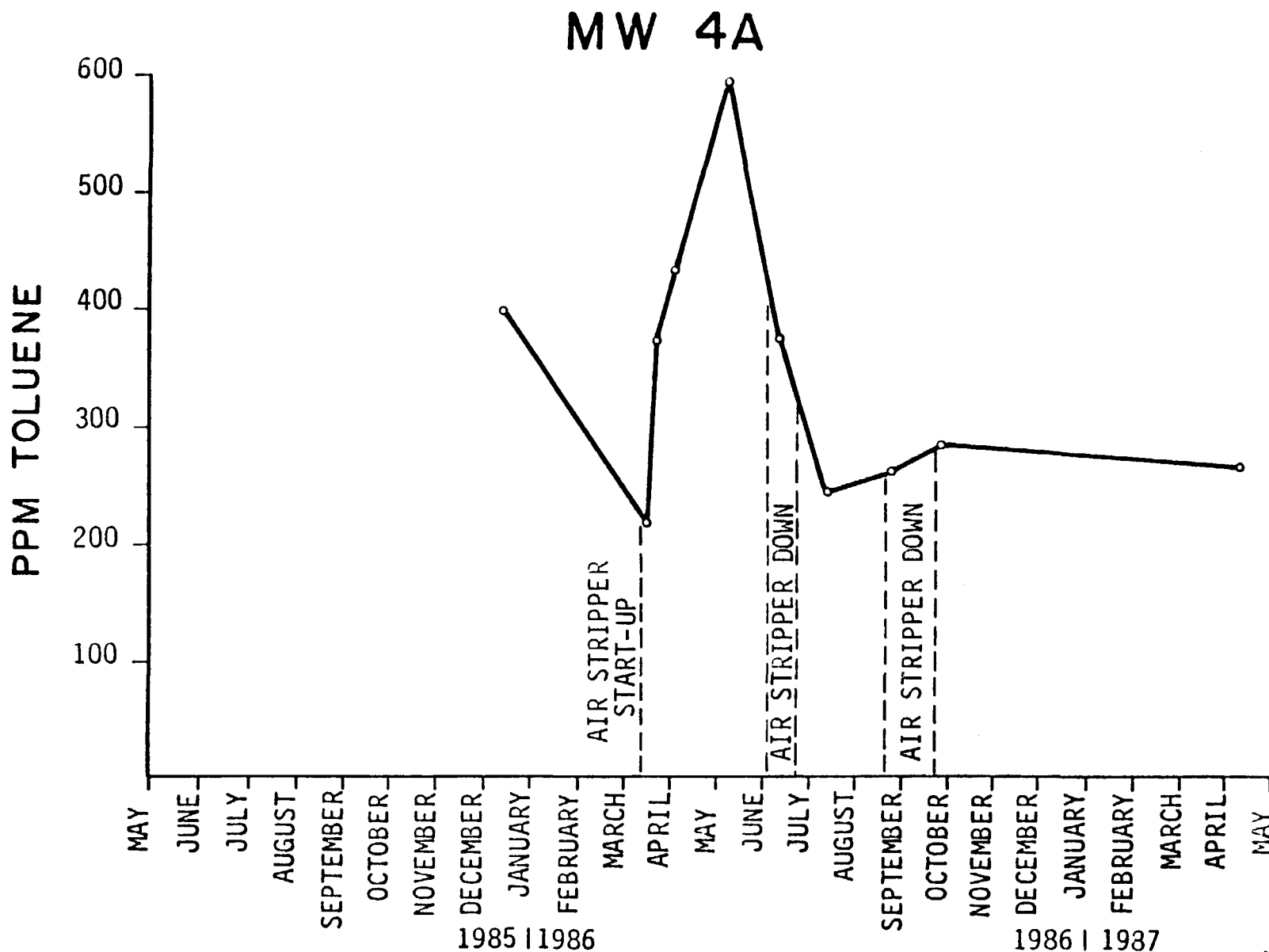
Should you have any questions regarding this matter, please feel free to contact me.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "T. R. Kirk". The signature is fluid and cursive, with the first name "T." and last name "Kirk" clearly distinguishable.

T. R. Kirk
Geologist

TRK:ds
Enclosures



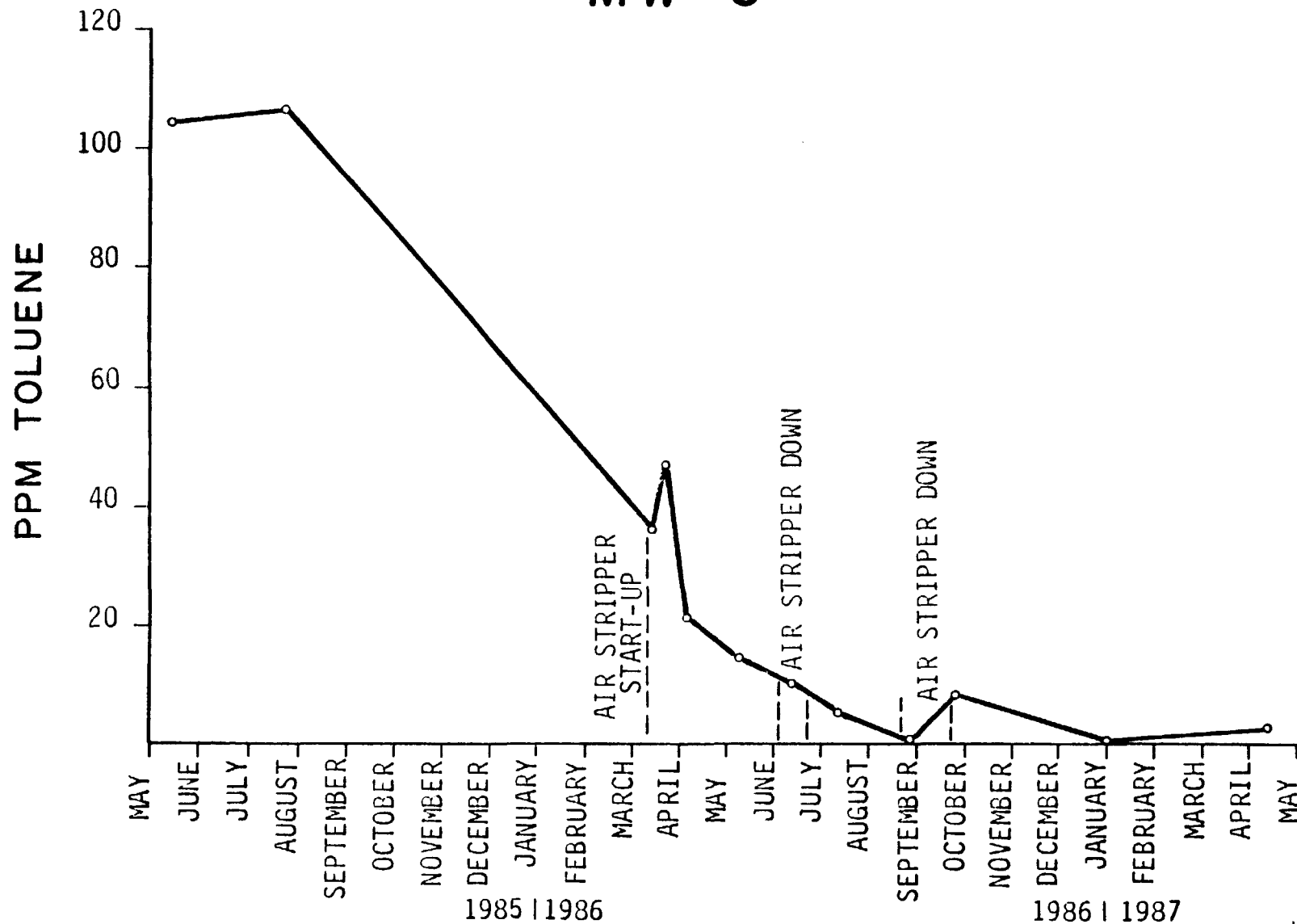
SUNDSTRAND AVIATION TOLUENE REMEDIAL ACTION RESULTS



FEHR, GRAHAM & ASSOCIATES
 CONSULTING ENGINEERS
 660 W. STEPHENSON ST., FREEPORT, ILLINOIS
 815/235-7643

4/29/87

MW 5



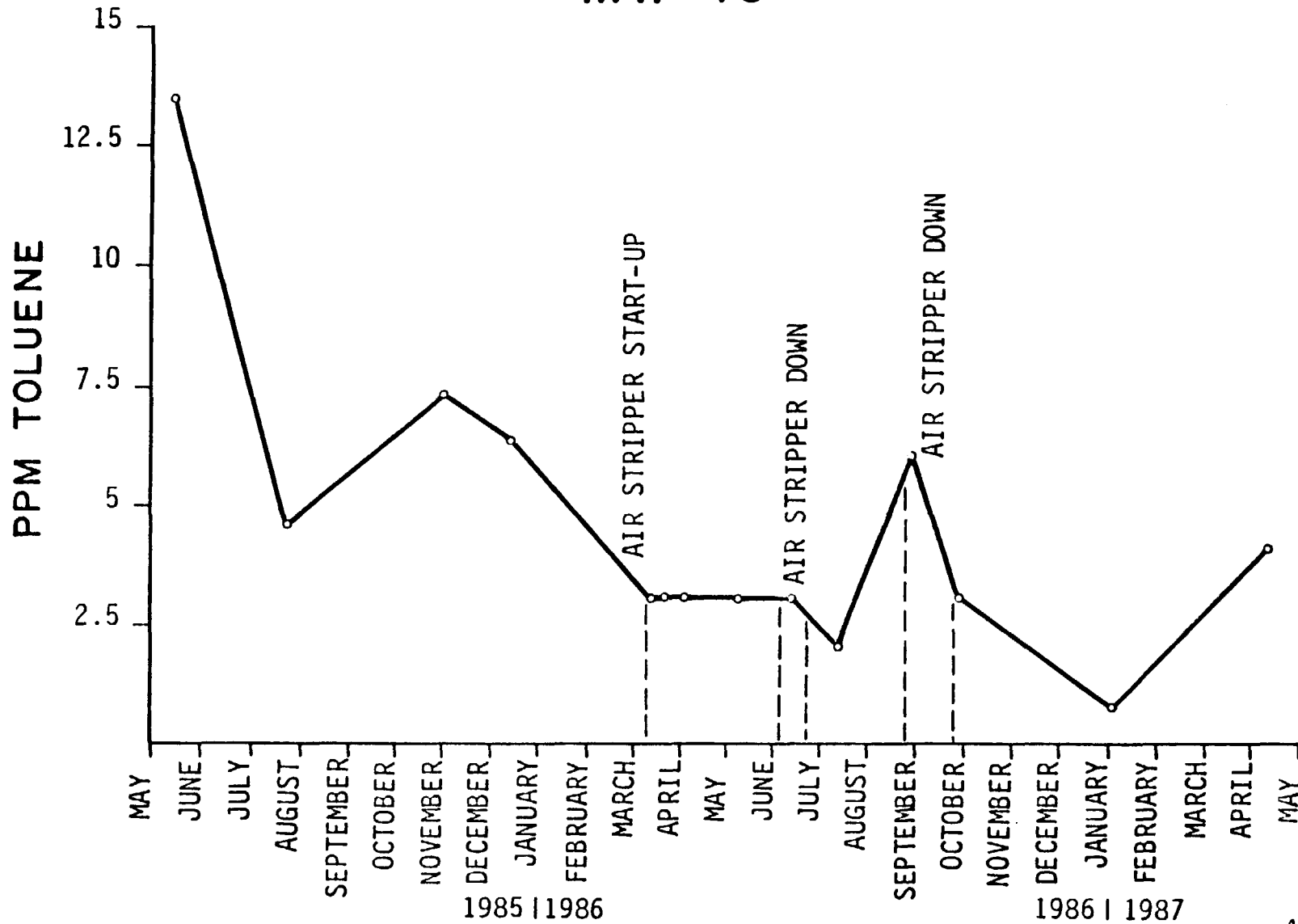
4/29/87

SUNDSTRAND AVIATION TOLUENE REMEDIAL ACTION RESULTS



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

MW 15

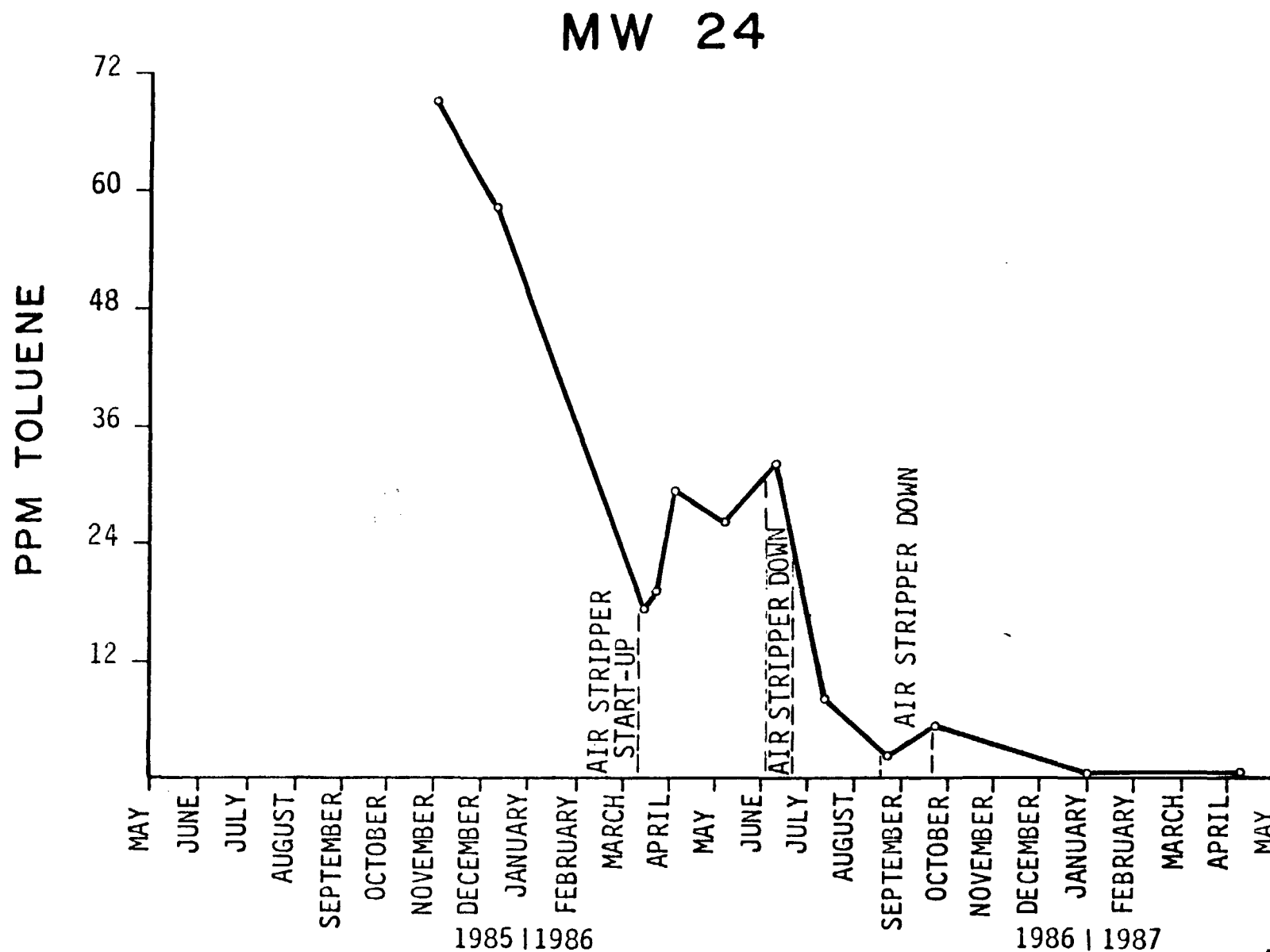


4/29/87

**SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS**



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643



4/29/87

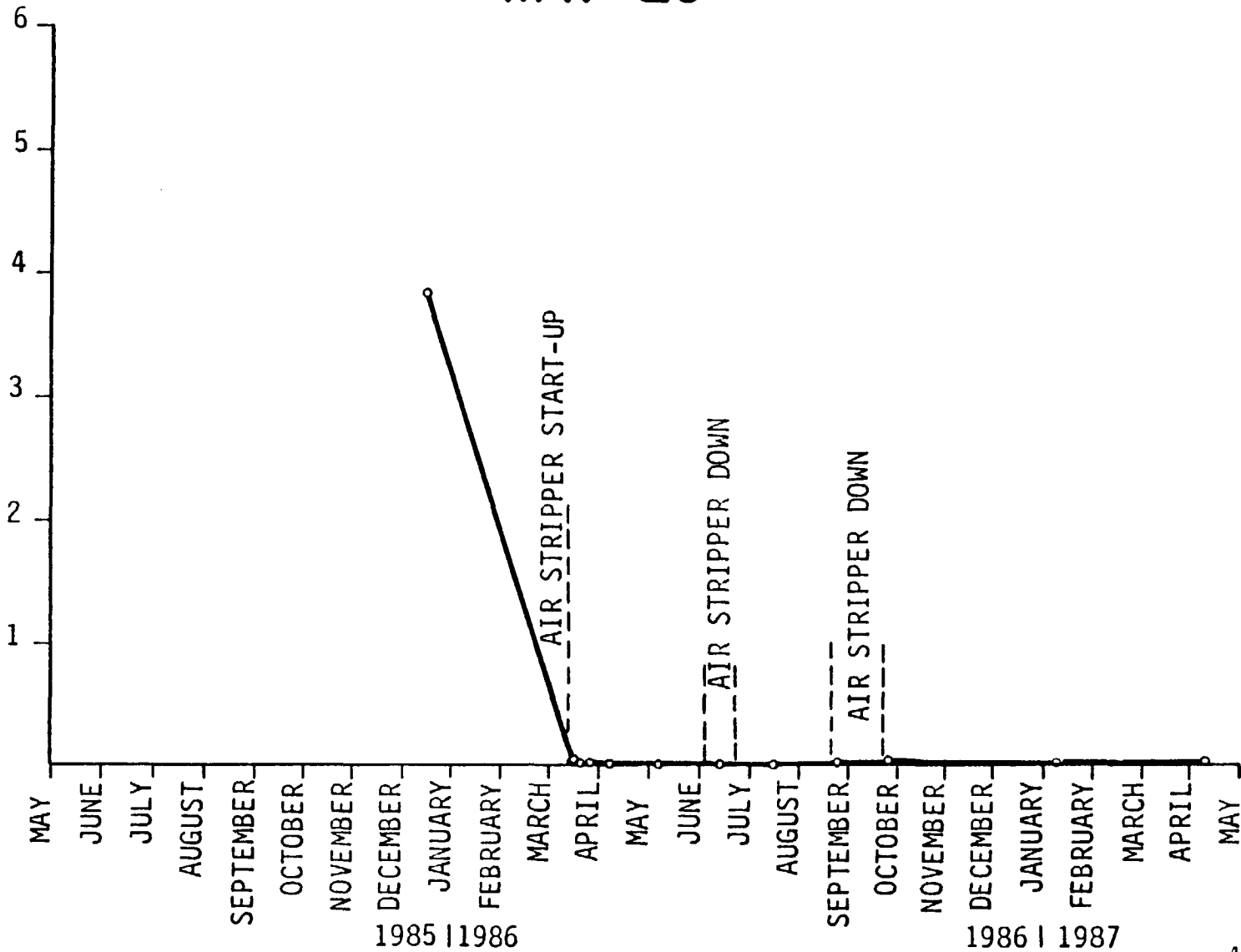
**SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS**



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

MW 25

PPM TOLUENE



SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235 - 7643

4/29/87

MONITORING WELL NO. 4A

SAMPLE RESULTS

PROJECT Sequoia strand JOB NO. 26143

BOTTOM ELEVATION 8051 GEOLOGICAL FORMATION Dolomite

[illegible]

Subc Sec. 2100
Air Strippers below

***P and G are not in the same class

MONITORING WELL NO. 5

SAMPLE RESULTS

PROJECT Sundstrand JOB NO. 26143

BOTTOM ELEVATION 779.4 GEOLOGICAL FORMATION Dolomite

	DATE	DATE	DATE	DATE	DATE	DATE
PARAMETER	3/13/86	3/20/86	3/27/86	4/3/86	5/7/86	** 6/13/86
Water level	807.49	804.62	804.75	805.08	805.01	809.71
Toluene	36 ppm	77 ppm	6 ppm*	21 ppm	17 ppm	10 ppm
Temperature °F	54.8	53.4	55.1	55.2	56.3	56.9
	7/11/86	** 8/25/86	9/25/86	1/8/87	1/9/87	
Water level	804.59	804.80	803.22	803.23	800.15	
Toluene	5 ppm	584 ppb	8 ppm	52 ppb	252 ppb	
Temperature °F	57.7	56.6	57.2	53.8	56.5	
* false reading						

* false reading

*** Air Stripper Down

MONITORING WELL NO. 10

SAMPLE RESULTS

PROJECT Suncostrand JOB NO. 26143

BOTTOM ELEVATION 757.85 GEOLOGICAL FORMATION Dolomite

	DATE	DATE	DATE	DATE	DATE	DATE
PARAMETER	3/1/86	3/20/86	3/27/86	4/3/86	5/7/86	** 6/10/86
water level	807.37	806.50	806.68	806.54	805.71	806.79
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb
temperature °F	51.0	48.8	49.0	51.7	52.5	54.0
	7/11/86	** 8/25/86	9/25/86	1/8/87	4/9/87	
water level	805.69	804.64	804.47	804.70	802.74	
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	
temperature °F	57.1	54.4	55.4	50.0	52.4	
** Air Station Closed						

MONITORING WELL NO. 24

SAMPLE RESULTS

PROJECT Sandstrand JOB NO. 26143

BOTTOM ELEVATION 768.6 GEOLOGICAL FORMATION Dolomite

[illegible]

* False. removing
** Air stripper down

MONITORING WELL NO. 25

SAMPLE RESULTS

PROJECT Sandstrand JOB NO. 26143

BOTTOM ELEVATION 706.3 GEOLOGICAL FORMATION Dolomite

[illegible]

MONITORING WELL NO. 26

SAMPLE RESULTS

PROJECT Semi-Strand JOB NO. 26143

BOTTOM ELEVATION 749.1 GEOLOGICAL FORMATION Dolomite

[illegible]



OK

May 15, 1985



Mr. William Coole
Assistant General Counsel
Sundstrand Corporation
P.O. Box 7003
Rockford, Illinois 61125-7003

Dear Bill:

Following our phone conversation and at your request, I am writing to outline the scope of information the Agency anticipates it will need to quickly evaluate your cleanup proposal when it is submitted.

Specific items of information include the location of the spill and its relationship to the source both areally and with depth. Maps and geological cross sections are helpful. The chemical composition of the spilled material and any environmental samples analyzed are essential. We are also interested in any data generated in your attempts to define the extent of the spill and how you interpret that data. Since the principal known threat to public health and the environment at this time appears to be via groundwater, our criteria for how clean is clean will heavily depend upon potential exposures via that medium. Consequently a very complete geological and hydrological description of the immediate area including groundwater flow gradients and their relationship to the overall geology of the county will be important. Unless the bedrock is fractured we would only be interested in those soils and groundwater horizons above it.

In addition to the comprehensive site description described above, we need to know specifics about the intended recovery and restoration processes you propose. We anticipate that the agency will focus on cleaning up ground waters to specific concentrations of the contaminants and that soil removal would only be required if there is significant near-surface contamination that may pose an air emission problem through volatilization or if significant dermal exposure seems likely.

You had mentioned to us that air stripping of contaminated groundwater was a treatment option you were considering. Our air pollution permit staff indicate that allowable emissions to the atmosphere (i.e., permittable) of volatile organic compounds is somewhat dependent upon the specific chemicals involved especially with regard to their photochemical reactivity. Enclosed is a current copy of our air pollution regulations. See sections 215.301 and 215.302 which seem to indicate that the emission limit for toluene (which is photochemically reactive) is 8 lbs./hr. or alternatively the process has 85



percent control (i.e., the emissions from the air stripper are treated by another process such as a carbon cannister or a condenser which reduces the solvent content 85 percent). To evaluate the process for an air permit the following minimum information will be needed: the concentration in water, rate of stripping (1 lbs./hr.) how those figures were calculated and what control measures will be used if the rate is over 8 lbs./hr.

A situation in Peoria involving similar chemicals has currently begun cleanup operations where the liable party opted for oil/water separation followed by activated carbon filtration of the groundwater with subsequent upgradient reinjection to flush the spill area. They had considered air stripping but apparently decided that it might limit the rate of recovery to comply with air emission regulations. You may also wish to consider that alternative. Criteria for reinjection and permits for discharge to state waters are specified in section 302.210 of the water pollution regulations (copy enclosed) which sets an aquatic toxicity value as the basis for allowable contaminants. For example, the value for one-tenth of the 96-hour median tolerance limit for bluegill sunfish (a native fish for which these values have been determined for many chemicals) is two parts per million (2 ppm) with regard to toluene. Our water permits staff would want to the rate and frequency of discharge, proposed frequency of sampling and how potential discharges would be contained while analyses were being performed. Containment and analyses are more critical for discharges to surface waters or storm sewers. In the past we have allowed continuous up gradient reinjection for flushing purposes with periodic analyses for TOC (total organic carbon) as a surrogate for specific chemical analyses so that breakthrough can be detected in the carbon system and timely sorbent replacement can be effected. Underground injection to an uncontaminated aquifer will not be allowed.

If you anticipate using other recovery technologies please submit detailed documentation and case studies indicating their efficiency and applicability to your specific situation.

I must appologize for the timeliness of my response. We have had an unusual number of serious emergencies lately coupled with some of the staff being out sick. Should you have further questions feel free to call me at 217/782-3637.

Sincerely,

A handwritten signature in dark ink, appearing to read "James P. O'Brien".

James P. O'Brien, Chemist
Emergency Response Unit

Attachments

cc: Bob Wengrow
JOB/rt

SEQUENCE OF EVENTS FROM

AUGUST 30, 1984 TO DECEMBER 19, 1984

- August 30, 1984 - Interstate Pollution Control (IPC) notified to pump out water from spill containment tank at Cell 65, Plant 6 at approximately 10:00 A.M.
- IPC came in at 1:35 P.M. to pump containment tank and left the premises at 2:12 P.M. According to the manifest, they hauled approximately 3,000 gallons away. IPC noticed nothing unusual or different about this load, neither at our facility or theirs.
- August 31, 1984 - Toluene was discharged from vaporizer and/or ORC unit in the afternoon. Exact time is not known.
- September 4, 1984 - Hydrite Chemical Company came in at 11:41 A.M. and pumped 2,185 gallons from the containment tank. They departed at 12:45 P.M. Tank had distinct odor of Toluene. Approximately 14" left in tank = 439 gallons.
- September 5-6, 1984 - Hydrite notified us via telephone the load pumped on the 4th of September was 100% water.
- September 10-14, 1984 - Contractors first smelled something in soil and found small puddle of liquid in bottom of excavation. Excavation was approximately 6-7 feet deep. Sample of liquid taken and checked by Sundstrand Met Lab which revealed trace amounts of Toluene. Sample of liquid taken by Al Munn at request of Joe Vavra, Facility Engineer. No analysis was run. Check made by smell and visual inspection. Excavation stopped at this time by Joe Vavra.
- September 19, 1984 - Hydrite Chemical Company came in at 7:25 A.M. and pumped 2,375 gallons from the containment tank. They departed at 9:40 A.M.

- September 20-21, 1984 - Hydrite notified us via telephone the load pumped on the 19th of September was 100% water. Followed with a letter and copy of analysis dated October 12, 1984. (See Exhibit A)
- September 24, 1984 - Contractors dug deeper resulting in the formation of a new larger pool of liquid and moist soil. A sample of soil was collected and sent to Suburban Laboratories, Inc. for analysis. Sample collected by Al Munn, Joe Vavra and Jim Jacob.
- September 27, 1984 - Suburban Laboratories received the sample.
- October 18, 1984 - Analysis of soil sample was received from the laboratory. (See Exhibit B)
- October 19, 1984 - Corporate Loss Control contacted and Fehr-Graham of Freeport called in as consultants.
- October 22, 1984 - Consultants first visit to our facility and the site in question.
- October 29, 1984 to November 23, 1984 - Four (4) soil borings and three (3) monitoring wells installed. Samples of soil and water taken and analyzed.
- December 3, 1984 - Fehr-Graham and Associates began a second series of soil and water sampling.
- December 5, 1984 - A meeting was conducted with Fehr-Graham to discuss findings and present written reports and recommendations. In attendance were: Jim Carlson, Bill Coole, Don Burchard, Jack Johnson, Ron Waxler, Jim Barry, Allen Fehr (Fehr-Graham), Bill Johnson, Mark Chiado, Quentin Davis (Fehr-Graham), Jim Jacob and Al Munn.

- December 6, 1984 - A meeting was conducted with Sundstrand Aviation management to notify them of problem. In attendance were: Bill Coole, Leo Keenan, Bernie Kittle, Dave MacMorris, Arnie Havens, Larry Myers, Don Burchard, Jim Jacob and Al Munn.
- December 7, 1984 - The National Response Center in Washington, D. C. was notified by Bill Coole and Don Burchard. After which they notified the Rockford office of the Illinois Environmental Protection Agency.
- First visit by Chuck Corley of the IEPA. Arrived 3:30 P.M. and met with Bill Coole, Jim Jacob and Al Munn. Left at 4:30 P.M.
- December 10, 1984 - Open surface areas measured and rainfall recorded from the National Weather Service (for a period August 30, 1984 to September 19, 1984) to determine possible accumulation of rainwater in the containment tank. Accumulation for time period specified = 237.47 gallons. (See Exhibit C)
- December 12, 1984 - Integrity of tank and drain line inspection begun. Visual inspection of inner tank revealed no obvious breaks or leaks in walls, cap or cap seal. Floor had layer of mud and water so floor was not visible. Was evidence of water leaking in from bottom. Drain lines dye checked with flows making it to the tank. No sign of pipe breakage.
- December 17, 1984 - Drains to containment tank were plugged and tank pumped out. Began to measure water level within tank as it accumulated. Began recording water intake to makeup pit for ORC Cooling Tower.
- December 19, 1984 - Fehr-Graham and Associates began a third series of soil and water samples to determine extent of exact area of contamination.

Sundstrand Corporation



Exhibit A(e)4

CORPORATE OFFICES • 4751 HARRISON AVENUE P.O. BOX 7003 • ROCKFORD, ILLINOIS 61125-7003 • PHONE (815) 226-5000 • TWX 910-631-4255 • TELE X 251 440

July 24, 1985

Emergency Response Unit
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62706

Attention: Mr. James P. O'Brien

Dear Mr. O'Brien:

With reference to our telephone conversation of July 17, 1985, please find enclosed two copies of Sundstrand's Proposed Remedial Action Plan relating to the toluene release at our plant at 4747 Harrison Avenue.

Based upon our conversation, it is my understanding that after the Illinois Environmental Protection Agency has had the opportunity to review the Proposed Remedial Action Plan you will arrange a meeting with us so that the Plan can be discussed. As I indicated to you, we would like to have the meeting during the first week in August if that is possible.

We look forward to meeting with you at your convenience.

Very truly yours,

SUNDSTRAND CORPORATION

William R. Coole
Assistant General Counsel

WRC:jmf

Attachments

cc: Chuck Corley
bc: Joe J. McCarthy
Allan Sedmak
Larry A. Myers
Curtis Rosser
Mark Chiado
Al Munn



PROPOSED REMEDIAL ACTION PLAN

FOR

TOLUENE RECOVERY

AT THE SUNDSTRAND PLANT

LOCATED AT

4747 HARRISON AVENUE

ROCKFORD, ILLINOIS

I. Introduction

A. Description of the release.

At its facilities located at 4747 Harrison Avenue Sundstrand maintains test cells which are located south to southeast of the main office building (See Figure #1). The test cells contain a runoff drainage system which is connected by pipe to a concrete spill containment sump (the "sump") which is used to collect liquids that are spilled within the test cells. In August of 1984 Sundstrand began dismantling equipment located in one of the test cells which had been used in conjunction with its Organic Rankin Cycle Program. As a preliminary to dismantling the equipment it was necessary to drain the toluene which was used in the equipment as a heat exchange medium. Accordingly, on August 31, 1984 between 600 and 800 gallons of toluene was drained from the equipment and barrels located in the test cell and was retained in the sump for subsequent disposal.

On September 4, 1984, a properly licensed waste hauler engaged by Sundstrand removed approximately 2,200 gallons of liquid from the sump. Following transport of the liquid to its facility, the waste hauler tested the waste and advised that there was little or no toluene in

the liquid which had been pumped from the sump. On September 19, 1985 the waste hauler returned to Sundstrand and removed the entire contents of the sump, approximately 2,400 gallons of liquid. Upon sampling the second load at its facilities the waste hauler advised that there was little or no toluene in this load.

Sundstrand later contacted Fehr-Graham and Associates, Consulting Engineers, to assist in determining whether the toluene had been released from the sump.

The location and construction detail of the spill containment sump is shown on Figure #1 and Figure #2.

Following several weeks of study and both internal and external examination of the sump the conclusion was reached that the sump was not secure and that a mounded water table existed in the vicinity of the sump. Accordingly, it has been surmized that water was able to enter the sump at its base and as the water level rose the toluene was able to escape from the sump through concrete joints at the top. As this determination was made, contact was made on December 7, 1984 with the National Response Center and the Illinois Environmental Protection Agency to advise them of the toluene release.

B. Scope of this report.

Analysis of water samples from the monitoring wells that were installed to provide hydrogeologic information and contaminant levels resulting from the toluene release indicate that additional volatile organics in low concentration exist on the site. This report only addresses the toluene release of August 31, 1984, the subsequent movement of the toluene in the groundwater and the remedial action plan to remove the toluene from the groundwater. Sundstrand has taken action to reduce

and/or eliminate the source of the other contaminants and has undertaken a preliminary hydrogeologic study relative to the other volatile organics on the site.

Because the plume of contamination contains a high concentration of toluene and is in a relatively small area Sundstrand is of the opinion that remedial action addressing the plume is appropriate. Accordingly, we intend to install a recovery well close to the leading edge of the plume and pump the groundwater containing the toluene to an airstripper that is designed to remove not less than 99% of the toluene and other volatile organics from the water. The water discharged from the airstripper will then be used to flush the contaminated unsaturated soil along the flow path from the source of the toluene release to the recovery well and/or discharged to the Sanitary District of Rockford wastewater treatment plant (POTW).

C. Summary of regional hydrogeology and groundwater use.

Sundstrand's plant site at 4747 Harrison Avenue is in excess of 80 acres and is located in T43N, R2E of the 3rd P.M. in Winnebago County. The topography of the area surrounding the site is shown on Figure #5. The site is in an upland area between the Rock River and the north branch of the Kishwaukee River. It is within the surface watershed of the Rock River. The site is generally flat and lies along the fringe of the upland area. Locally steep slopes occur south of the site due to a valley tributary to the Rock River.

The stratigraphic column typical of Boone and Winnebago Counties is shown in Figure #6. Beneath the plant site, dolomite belonging to the Galena Group forms the uppermost bedrock unit. Above this bedrock is approximately 20 to 80 feet of glacial sediment. Figure #6 also shows deep erosion of the bedrock surface forming

valleys in the bedrock. These valleys were formed in recent geologic time (Quaternary time) and have been filled by Quaternary glacial sediments. In the Rockford area, a prominent north-south trending bedrock valley is 400 feet deep penetrating into the St. Peter Sandstone. In the deeper portion of this bedrock valley, the sediments consist of sand and gravel glacial outwash and is a primary source of water supply for the City of Rockford. Figure #7 is a topographic map of the bedrock surface showing the locations of the deep bedrock valleys with respect to the plant site.

Bedrock formations which are fresh water aquifers are the St. Peter Sandstone, Iron-ton-Galesville Sandstone, and Mt. Simon Sandstone. The St. Peter Sandstone is in hydraulic communication with the glacial aquifers which fill the bedrock valley. The deeper bedrock aquifers (Iron-ton-Galesville, and Mt. Simon Formations) do not have good hydraulic communication with shallower aquifers because they are beneath the less permeable Potosi, Franconia, and Eau Claire Formations. Accordingly these deep aquifers are better protected from contamination.

The City of Rockford has approximately 40 municipal water supply wells. About half of these wells are in the sandstone aquifers and are fairly evenly distributed throughout the City. The City well nearest the Sundstrand plant site is located across the street north of the plant and is 1,313 feet deep. Shallower City wells are located in the sand and gravel aquifer in a north-south trend over the bedrock valley.

The Galena and Platsville Groups comprise 300+ feet of dolomite and are the uppermost bedrock units underlying the plant site. Although these dolomites are

not considered a high yield aquifer, joints, bedding planes, fractures, and solution openings do provide adequate water for residential use. Groundwater within this dolomite recharges the Mt. Simon Formation and the sand and gravel deposits in the bedrock valleys.

D. Applicable Illinois statutes and rules.

The March 1, 1984 rules and regulations of Title 35; Environmental Protection Subtitle G; Waste Disposal Chapter 1; Pollution Control Board State of Illinois are applicable to the toluene spill.

II. Extent of contamination.

A. Methods of investigation and quality control.

In an effort to determine if there was any groundwater contamination, Monitoring Wells 1, 2, 3, 4, 5, 6, and 7 were installed in November and December of 1984. These wells were located as shown on Figure #1. Monitoring Wells 1, 2, 3, 4, and 5 were installed at different depths to determine in addition to contamination, the hydrogeologic conditions adjacent to the suspected toluene release. Monitoring well 6 was installed as an upgradient monitoring well and Monitoring Well 7 was installed as a downgradient monitoring well. All monitoring wells were installed as follows:

1. A 7 1/2 inch hollow stem auger was used in the soil portion of drilling to a depth not to exceed 50 feet.
2. A 4 inch rotary drill was used to penetrate rock or for depths of greater than 50 feet.
3. During rotary drilling, water was used for flushing. If caving was encountered, a minimal amount of drilling mud was used.

4. The drilling was completed to a depth of 1 to 2 feet beyond the planned well bottom elevation. This allowed for fines to settle and a gravel base to be installed.
5. A 5 foot screened section with 0.010 inch slots was set at the bottom.
6. Two inch PVC pipe was then attached in 10 foot lengths. The flush treaded fittings were used with Teflon tape to seal joints.
7. The 2 inch PVC riser pipe and screen were installed to the required bottom elevation through the 4 inch center of the hollow stem auger. The top was taped to prevent gravel or other contaminants from entering.
8. Washed 1/4 inch pea gravel was added around the well screen to a level of 1 to 2 feet above the screen. When a bentonite slurry was used in drilling, it was rinsed out by forcing clean water down the well.
9. One foot of bentonite clay seal was installed directly above the pea gravel.
10. The well was then sealed with a 90% portland cement and 10% bentonite clay by forcing the mixture down the boring with a pipe to the bottom of the well.
11. The auger was slowly and carefully removed and the portland cement mixture was added until approximately 4 feet from the surface.
12. The 2 inch PVC pipe was cut off 2.5 feet above ground. A PVC threaded cap was placed on top followed by a locking protective cover. This cover was then fixed in place with a concrete pad. The inside space was then filled with the cement/bentonite mixture.

13. After the completed well sat undisturbed for 48 hours the well was purged by pumping 3 to 5 volumes.

The actual dimensions of the monitoring well construction are shown in Figure #3 and the monitoring well logs are included in Attachment #3. These monitoring wells were drilled to provide groundwater level, flow direction, groundwater velocities, and toluene contamination levels. Monitoring Well 4 showed an abnormally high water table relative to the other wells.

A series of 10 soil borings were taken to a depth of approximately 25 feet in the area of the sump in an effort to determine unsaturated soil contamination and groundwater levels in the area of the sump. These borings labelled as B-1 through B-10 are located as shown on Figure #4. The toluene concentration in these borings is shown on Attachment #1.

The soil boring samples were collected as follows:

1. Soil samples were collected with a hollow stem auger and a split spoon soil sampler.
2. The hollow stem was augered to the desired depth and the split spoon was then attached.
3. The split spoon was washed prior to each sampling. All tools and equipment that made direct contact with the soil samples were cleaned as follows:
 - a. Washed with water to remove visible dirt.
 - b. Rinsed with acetone.
 - c. Rinsed three times with organic free water.
4. The split spoon was forced into the soil with a drillers hammer. The split spoon was extracted with an 18 inch sample.

5. The soil sample was removed from the spoon and placed in a sample jar utilizing organic free utensils. The sample jar was then placed into a chilled container for further processing.
6. After collection of all necessary soil samples from each boring location, the auger was removed and the boring was sealed.
7. Portland cement was mixed with finely ground soil. This mixture was gradually added back into the boring hole with a small amount of water.

Water levels from the soil boring information and the monitoring well water levels made it obvious that there was an artificially mounded water table in the vicinity of the sump. Additional soil borings WB-1 through WB-4 located as shown on Figure #4 were taken at a later date to better define the mounded water table and to determine if there was a direct connection between the mounded water table and the liquid level in the sump. WB-1 and WB-2 borings showed the groundwater level adjacent to the spill sump to be at a level of approximately 4.5 feet below the surface. The liquid in the sump was then dyed with a fluorescent dye and water was added to the sump to raise the water level in the sump above the water level in the surrounding ground. The fluorescent dye was immediately detected in borings WB-1 and WB-2 indicating a direct connection between the sump and the groundwater level. A leak in a non-contact cooling water pipe was later determined to be causing the mounded water table at the sump. It is believed the mounded water table caused water to enter the sump at its base and flush the toluene through the unsaturated soil and into the groundwater.

Monitoring wells 8, 9, 10, 11, 12, 13, 14, 15, and 16 were installed between December and February of 1985. These wells were located as shown on Figure #1. Monitoring wells 12, 13 and 14 were additional upgradient monitoring wells that were installed because monitoring well 6, which was originally expected to be an upgradient well, showed small concentrations of toluene. Monitoring wells 8 and 9 were installed to help define the groundwater flow and geology of the area. Monitoring wells 10, 11, 15 and 16 were installed to more accurately define the toluene plume movement and direction with time.

Sample collection and monitoring well water levels were obtained as follows:

1. Sample collection of groundwater from the monitoring wells is completed with the use of an ISCO bladder pump and Well Wizard control box.
2. The pump and Teflon discharge tubing were thoroughly cleaned before and after each daily sampling with the following procedure:
 - a. The pump was submersed in a phosphate soap solution which was flushed through the tubing.
 - b. Next organic free water was flushed through the pump and tubing.
 - c. This was followed with an acetone rinse.
 - d. Next 1 to 2 gallons of organic free water was flushed through the system.
 - e. A new bladder was installed between each daily sampling or job location.
3. The pump and Teflon tubing were cleaned between each well with the following procedure:
 - a. The pump was submersed in a phosphate soap solution and then emptied of its contents.

- b. The pump was rinsed and 3 pump volumes of organic free water which were drawn through the pump and tubing.
4. Each monitoring well was evaluated for the contaminants expected and the level at which they might exist. The well least likely to contain contaminants or the well with the lowest concentrations was sampled first.
5. After the well has been unlocked and the cap removed, the following information was gathered and recorded.

Static depth (groundwater elevation) was measured with an electrical circuit meter. This measurement was taken to .01 of a foot. The elevation of the groundwater was obtained by subtracting the static depth from the elevation of the top of the PVC pipe. The meter was rinsed with organic free water between each measurement. The water levels are shown in Attachment #3.

6. The pump was lowered into the well and three well volumes of water were removed before sampling.
7. The temperature was taken just prior to collection of the water. The water was then collected from the Teflon tubing after slowing the pump speed down to eliminate vigorous mixing and aeration.
8. A duplicate sample was taken from each well and a field blank was collected daily by sampling the final rinse water in the cleaning process.
9. The pump was then removed from the well and cleaned prior to inserting in the next well.

Sample storage, preservation, and methods of analysis were as follows:

1. The samples gathered were immediately placed into a 4°C chilled cooler and were shipped directly to the laboratory.
2. Volatile organics required no preservative and were collected in a 40 ml glass vial with a Teflon cap (provided by the laboratory). The sample was void of air bubbles.
3. Upon delivery to the laboratory the chain of custody sheet was signed and dated. The samples were then refrigerated until analyses was completed.
4. Each sample vial was labelled with an identifying number, date, and company name. These are then all referenced to the chain of custody sheet.
5. The Laboratory Quality Assurance is included in the appendix as Attachment #4.

Monitoring well slug tests were completed on March 8, 1985 for the 16 monitoring wells to determine permeability and flow rates of the groundwater in the formations that were penetrated by the monitoring wells. These results and permeability calculations are shown in Attachment #2. The slug tests were conducted in the monitoring wells by dropping a 0.06 or a 0.066 cubic foot volume in the monitoring well and causing a sudden rise in level of the water level in the monitoring well. The time was then recorded for the monitoring well water level to recede to its static level. This information was analyzed by the method of Hvorslev (1951) as described by Freeze and Cherry (1971). The calculated permeabilities are as follows:

<u>MW#</u>	<u>Material</u>	<u>Depth (Ft.)</u>	<u>Permeability(Ft/sec)</u>
1	Dolomite	126.6	1.1×10^{-6}
2	Fractured Dolomite	42.5	6.1×10^{-7}
4	Till	11.4	4.0×10^{-5}
5	Dolomite	65.1	1.9×10^{-5}
6	Fractured Dolomite	38.0	4.7×10^{-7}
7	Till	30.6	4.4×10^{-6}
8	Till	19.0	4.1×10^{-6}
9	Fractured Dolomite	52.5	6.0×10^{-6}
10	Dolomite	87.4	9.3×10^{-5}
13	Dolomite	65.6	1.0×10^{-5}
14	Dolomite	100.6	9.0×10^{-6}
15	Dolomite	50.0	1.2×10^{-6}
16	Dolomite	200.6	2.5×10^{-4}

The geometric mean of the permeability in the dolomite formation is 6.0×10^{-6} feet per second.

B. Evaluation of results.

1. Soil stratigraphy.

Sixteen monitoring wells and ten borings have been drilled on the plant site at the locations shown on Figure #1. Logs of these monitoring wells are in Attachment #3. Based on these logs, the depth to bedrock is quite variable, ranging from 14 feet at well 6 to 80 feet at well 16. In the immediate area of the sump, the depth to bedrock is approximately 25 feet.

The glacial sediment above the bedrock consists primarily of sand and silt, with some clay and gravel intermixed. The upper part of the bedrock is weathered and highly fractured, resulting in an uneven boundary between the dolomite and the till. The highly fractured zone extends 30 to 35 feet into the bedrock.

2. Groundwater occurrence and movement.

The toluene contamination is contained in the upper low permeability dolomite formation that is protected from the portable groundwater aquifers, namely the St. Peter Sandstone and Mt. Simon aquifers, by impermeable layers as shown in the soil stratigraphy cross sections previously.

The groundwater level in the area of the toluene plume is approximately 33 feet below the surface and 12 feet below the top of the Dolomite formation. Piezometric contours are plotted on Figure #8 from the monitoring well water level elevations. It can be seen that groundwater movement in the area of the toluene plume is in a southwesterly direction from the spill containment sump in the direction of Monitoring Well #15. The groundwater also moves vertically downward along this path.

As previously mentioned, the leaking cooling tower piping caused a mounded water table 4.5 feet below the surface at the sump. The mounded water table had an approximate 55 foot radius at which point it intersected the normal water table which was approximately 33 feet below ground surface. This mounded water table carried the toluene from the sump through the till and into the

dolomite until it reached the normal water table. When the toluene reached the normal water table, it moved at the same rate as the groundwater.

Contaminants in groundwater move according to the processes of advection and dispersion. Advection is the movement of a contaminant due to hydraulic gradients. A contaminant moving solely by advection travels in exactly the same direction and at the same rate as the groundwater moves.

Dispersion is the movement and spreading of a contaminant due to chemical diffusion, retardation, and irregular velocities associated with individual aquifer pores. Dispersion tends to cause spreading and dilution of contaminant plumes. In relatively permeable aquifers, such as the dolomite at the Sundstrand site, advection is clearly the dominant process of contaminant transport. In the following discussion dispersion is ignored, and advective transport only is considered. The following discussion mathematically models the toluene movement from the spill containment sump through the groundwater. The toluene release from the sump flows through three distinct zones which are as follows:

Zone 1 - Mounded water table in the till

Zone 2 - Mounded water table in the dolomite

Zone 3 - Normal water table in the dolomite

These zones are shown in Figure #9. The Zone 1 horizontal hydraulic gradient of the mounded water table (see Figure #9) is 28.5 feet vertical over 55 feet of horizontal distance of 0.52 feet per foot. The calculated horizontal velocity in Zone 1 was calculated from the following formula:

$$V_{H1} = \frac{K I}{P} \times (86,400)$$

where

V_{H1} = horizontal velocity in feet/day in Zone 1

K = permeability of formation (MW#4) in ft/sec
calculated from slug test data as shown in the
Appendix

I = hydraulic gradient in feet/feet

P = porosity of formation = 0.3 (from the McWhorter
and Sunada, 1977 as prepared for Division of
Waste Management, and published in December
1982)

$$V_{H1} = \frac{(4.0 \times 10^{-5}) (0.52) (86,400)}{0.3} = 6.0 \text{ ft/day}$$

Groundwater in the mounded zone moves
vertically through the till and dolomite. Because
the permeabilities of these two materials are
different, the following formula was used to
calculate an equivalent permeability.

$$K_E = \frac{L}{\frac{L_T}{K_T} + \frac{L_R}{K_R}}$$

where

K_E = equivalent permeability of Monitoring Well 2
and Monitoring Well 4 in ft/sec

L = Vertical distance in feet

L_T = Vertical distance of till in feet

K_T = Permeability of till (MW#4) in ft/sec

L_R = Vertical distance of dolomite in feet

K_R = Permeability of dolomite (MW#2) in ft/sec

$$K_E = \frac{28.5}{\frac{16.5}{4 \times 10^{-5}} + \frac{12}{6.1 \times 10^{-7}}} = 1.4 \times 10^{-6} \text{ ft/sec}$$

The vertical hydraulic gradient was calculated from the difference in monitoring well 4 and monitoring well 2 water levels as 1.17 feet/feet. The vertical velocity in Zone 1 and Zone 2 is therefore:

$$\frac{(1.4 \times 10^{-6})(1.17)(86,400)}{0.3} = 0.5 \text{ feet/day}$$

Zone 3 calculations are for movement in the dolomite below the natural water table. Because of the normal variations in dolomite formations, it was decided to use the geometric mean permeability of all the field results (6.0×10^{-6} ft/day).

The horizontal velocity in Zone 3 was calculated using the hydraulic gradient between monitoring wells 2 and 15 or

$$\frac{4.17 \text{ feet}}{36 \text{ feet}} = 0.1158.$$

Therefore the horizontal velocity equals

$$\frac{(6.0 \times 10^{-6})(0.1158)(86,400)}{0.3} = 0.2 \text{ ft.day.}$$

The vertical velocity in Zone 3 varies with depth in the dolomite formation. In the upper part of the formation in the area of monitoring well 2, the vertical hydraulic gradient is

$$\frac{3.98 \text{ ft}}{13.48 \text{ ft}} = 0.30 \text{ feet/feet}$$

In the area of Monitoring Well 1 the vertical hydraulic gradient was closer to 0.006 feet/feet. Therefore the vertical velocity in the upper part of the dolomite formation was 0.5 feet/day downward and the vertical velocity in the area of Monitoring Well 1 was closer to 0.01 feet/day downward.

In summary the approximate velocities of the three zones are as follows:

$V_{H1} = 6.0 \text{ ft/day}$
 $V_{H1} = 0.5 \text{ ft/day}$
 $V_{H2} = 0$
 $V_{V2} = 0.5 \text{ ft/day}$
 $V_{H3} = 0.2 \text{ ft/day}$
 $V_{V3} \text{ upper} = 0.5 \text{ ft/day}$
 $V_{V3} \text{ (90 ft deep)} = 0.01 \text{ ft/day}$

Figure #9 traces the path of the mathematically modeled toluene plume as it left the sump on August 31, 1984.

3. Groundwater quality.

The following table shows the laboratory results for toluene concentrations in each of the monitoring wells.

Laboratory Results for
Toluene Concentrations
in Parts per Billion

MW#	Depth (ft.)	Dec. 7, 1984	Feb. 27, 1985	May 13, 1985
1	126.6	20	25	
2	42.5	4,700	2,700	463
4	11.4	377,000	133,000	****
5	65.1	22	18,600	105,000
6**	38.0	24	N.S.	N.S.
7***	30.6	N.D.	N.S.	N.D.
8	18.9	*	*	N.D.
9	52.5	*	*	N.D.
10	87.4	*	37	N.D.
11***	40.0	*	N.D.	N.S.
12**	31.0	*	N.D.	N.S.
13**	65.6	*	N.D.	N.S.
14**	100.6	*	N.D.	N.S.
15	50.0	*	20,400	13,500
16***	200.6	*	14	N.S.

* Well not completed.

** Upgradient well.

*** Downgradient well.

**** Well inadvertently destroyed by heavy
machine operator.

N.D. Below detectable limits.

N.S. Not sampled.

The above laboratory results show the toluene plume to be approximately 65 feet below the surface and some 40 feet into the dolomite formation, Figures #10, #11, and #12 show the approximate toluene plume for their respective sampling dates. The mathematical model of the calculated theoretical path of the groundwater movement (Figure #13) shows the projected toluene plume for July 26, 1985.

III. Remedial Action Plan

A. Source elimination.

The sump which allowed the toluene to be released has been removed. All drain lines connected to the sump have been plugged. The non-contact cooling water pipe leak was repaired and the mounded water table has thereby been eliminated.

Remaining toluene in the unsaturated soils caused by the mounded water table will be addressed by injecting the discharge from the air stripping treatment facility or non-contaminated water into the soil at the former location of the sump. This will create an artificially mounded water table that will duplicate the original mounded water table thus flushing the unsaturated soil. The injection will be accomplished by a 10 foot long perforated 8 inch PVC drain tile placed 6 feet below ground surface in the area where the sump was formerly located.

The flushing of the unsaturated soil will continue until a level of less than 500 parts per billion of toluene in the soil is accomplished.

B. Goundwater purge system.

A proposed recovery well will be located as shown on Figure #4 to pump the groundwater containing toluene to an airstripping tower. Drawdown calculations for the proposed recovery well in the upper dolomite formation are based on the following:

Permeability = 6×10^{-6} ft/sec

Aquifer thickness = 300 feet

Storage = 0.1

Pumping duration = 30 days

Open hole length = 75 feet

Pumping rate = 20 gpm

Drawdown calculations were made using the Jacob Approximation for unsteady flow to a partially penetrating well. The drawdown curve is plotted on Figure #13. At a 75 foot pumping level, it is estimated that the recovery well will produce 20 gpm with a 42 foot drawdown. The 42 foot drawdown in the recovery well should allow the toluene plume to be substantially discharged to the recovery well as shown in Figure #4. The recovery well will be installed as shown on Figure #14 with start and stop level switches to maintain the drawdown at the 75 foot level. The submersible pump in the recovery well will be designed for a maximum of 40 gallons per minute at 125 feet of total dynamic head. This will require a one horse power submersible motor. The recovery well will pump directly to the airstripping tower.

C. Treatment System.

1. Design Conditions

Sundstrand's proposed recovery system will use a single purge well pumping at a rate of 20 gpm. It is estimated that the purge well will capture

groundwater with a concentration of toluene at 30 mg/l (ppm) and 1,1,1-trichloroethane at 3 mg/l. There are also other constituents in the groundwater at lesser concentrations. The purging of the groundwater will continue until a level less than 2,000 ppb total volatile organics is achieved.

There are inherent unknowns in groundwater cleanups such as the actual pumping rate necessary to capture the plume and actual initial contaminant concentrations. Therefore, a factor of safety will be included in the treatment system design as reflected in the following proposed design conditions:

Design Conditions

Flow rate:	20-40 gpm
Groundwater temperature:	55°F
Influent contaminant concentrations	
Toluene:	50 mg/l (ppm)
1,1,1-Trichloroethane:	4 mg/l (ppm)
Trichloroethylene:	0.2 mg/l (ppm)
1,1-Dichloroethylene:	0.2 mg/l (ppm)
Perchloroethylene:	0.2 mg/l (ppm)

2. Point of Discharge.

It is probable that at least part of the discharge from the air stripping tower will be used to effect soil flushing action. The excess discharge will be directed to the Sanitary District of Rockford wastewater treatment plant where the limit of 2.13 mg/l of total toxic organics (TTO) as defined and regulated by 40 CFR 433 will be met.

Alternatively, consideration has been given to release of the discharge to surface drainage. If this occurs, a toluene discharge limit of 2.0 mg/l will be addressed.

3. Proposed treatment.

Sundstrand proposes to treat the groundwater in a counter-current air stripping tower. This treatment method would use a single 24 inch diameter tower with approximately 25-30 feet of packing and an air flow rate of 400 cubic feet per minute. The tower will be designed to provide 99% treatment efficiency. Given the influent design parameters listed in Table 1, the total contaminant concentration in the effluent would be approximately 0.6 mg/l. A profile of the air emissions from this treatment method are listed on the previous page.

SUNDSTRAND CORPORATION

BY: _____

Title: _____

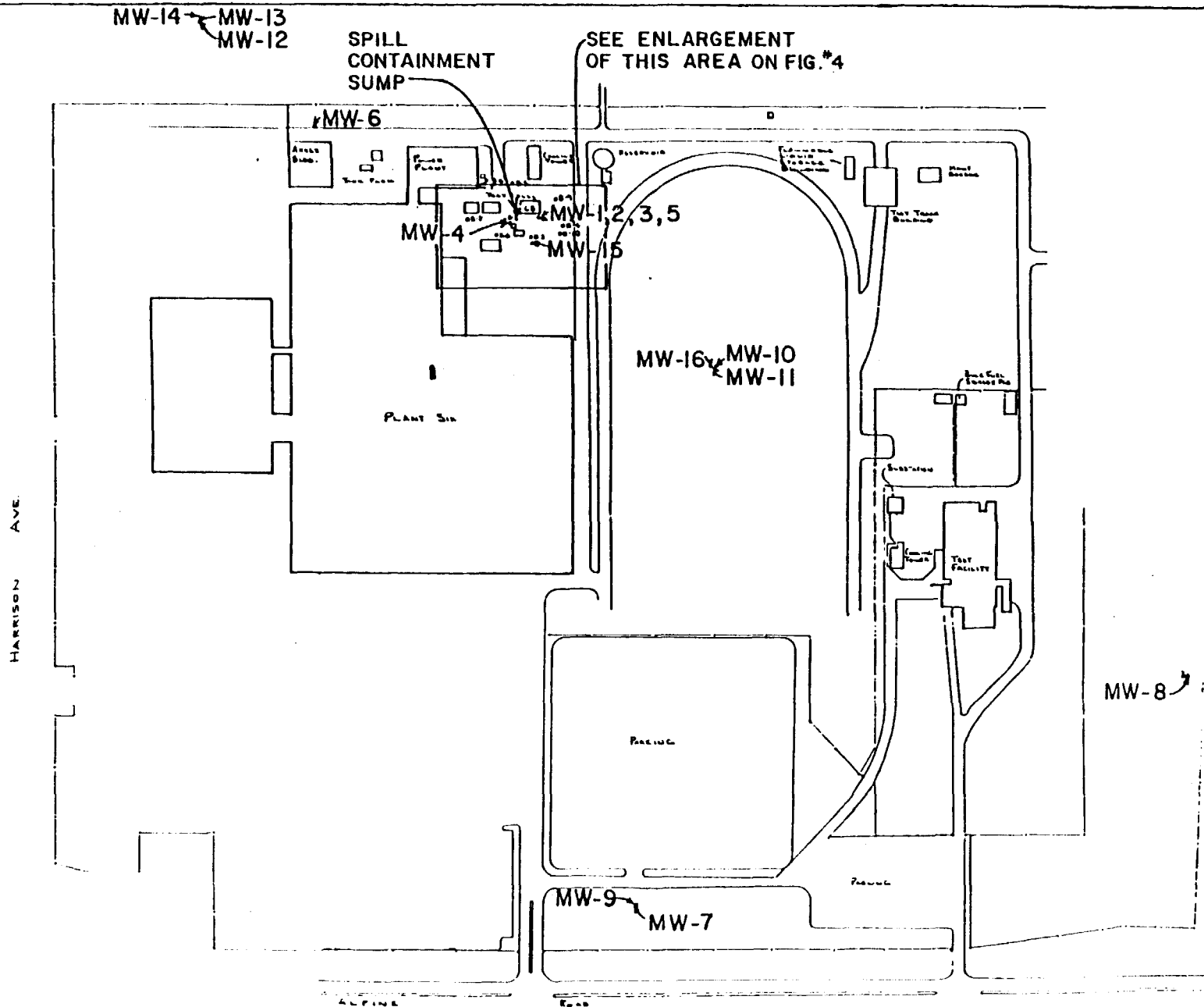
TABLE 1

AIR EMISSIONS PROFILE

Contaminant	Concentration at Tower Stack Exit				Est. 8-hr Conc. at 200 Ft*			Est. Annual Conc. at 200 Ft**	
	Mg/M ³	ppm	lb/hr	% TLV	ug/M ³	ppb	% TLV	ug/M ³	ppt
Toluene	660	172.3	0.989	172.3	163	42.6	4.3×10^{-2}	9	2350
1,1,1-Trichloroethane	52.71	9.51	0.079	2.7	13	2.35	6.7×10^{-4}	0.724	131
Trichloroethylene	2.67	0.49	0.004	1.0	0.66	0.12	2.4×10^{-4}	0.037	7
1,1-Dichloroethylene	2.67	0.67	0.004	6.7	0.66	0.17	1.7×10^{-3}	0.037	9
Perchloroethylene	2.67	0.39	0.004	0.8	0.66	0.10	1.9×10^{-4}	0.037	6

* Based on an estimated average 8-hour dispersion value of 4045 at 200 ft. from the source.

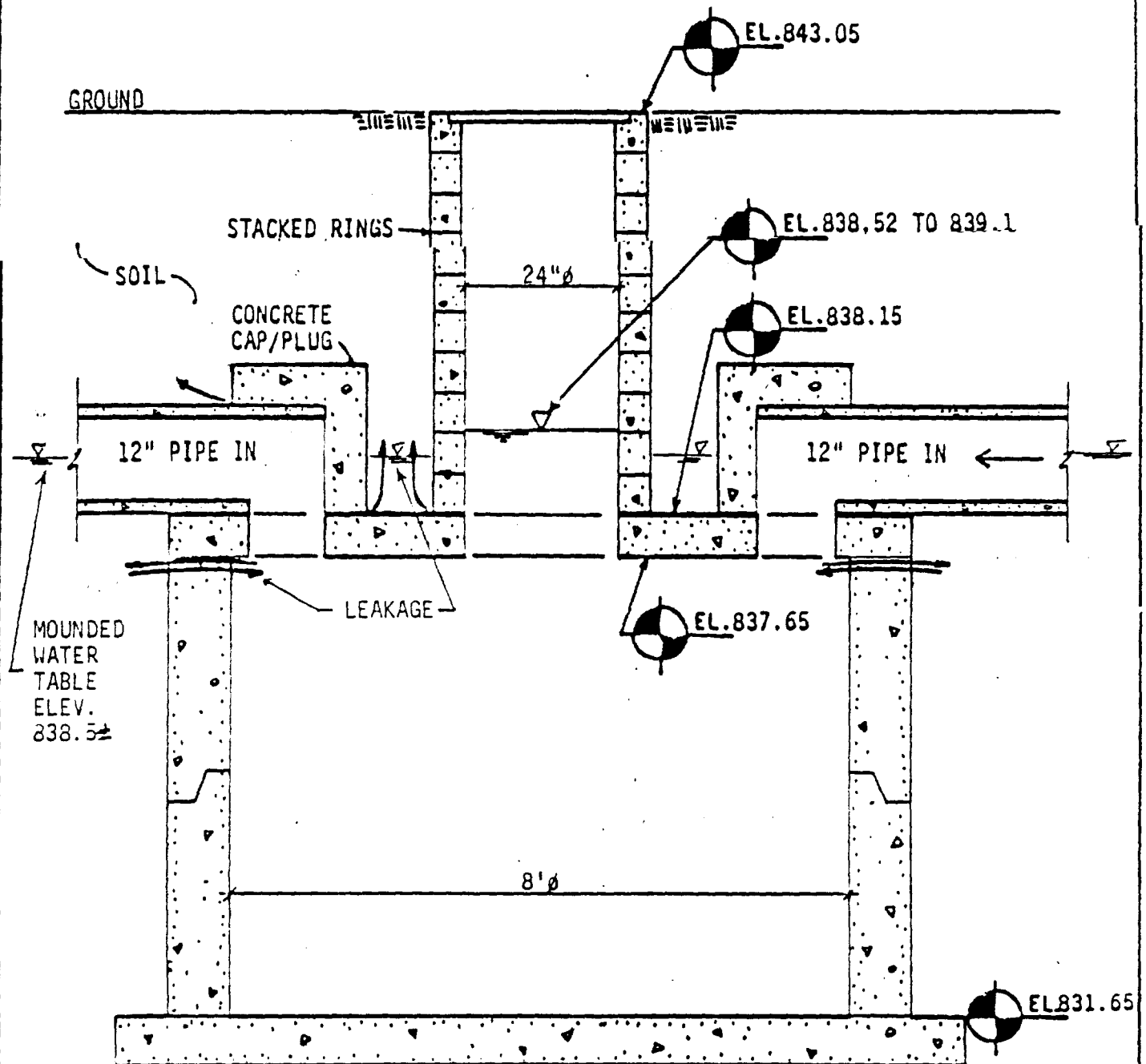
** Based on an estimated average annual dispersion value of 72,810 at 200 ft. from the source.



SCALE: 1" = 200'

FIGURE No. 1

SPILL CONTAINMENT SUMP



JAN. 7, 1985

FIGURE No. 2

SCALE: 1/2" = 1'-0"



FEHR, GRAHAM & ASSOCIATES

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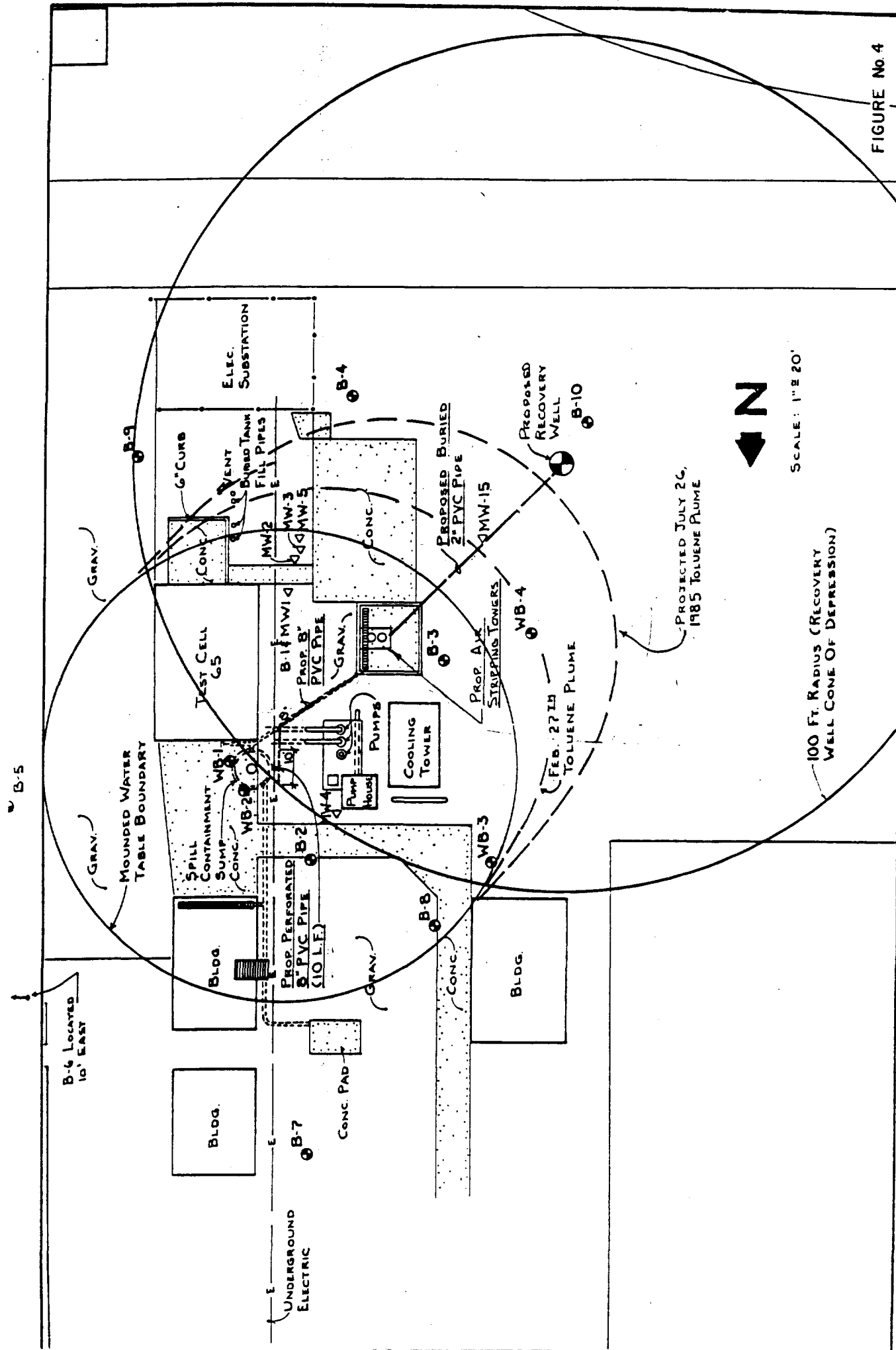
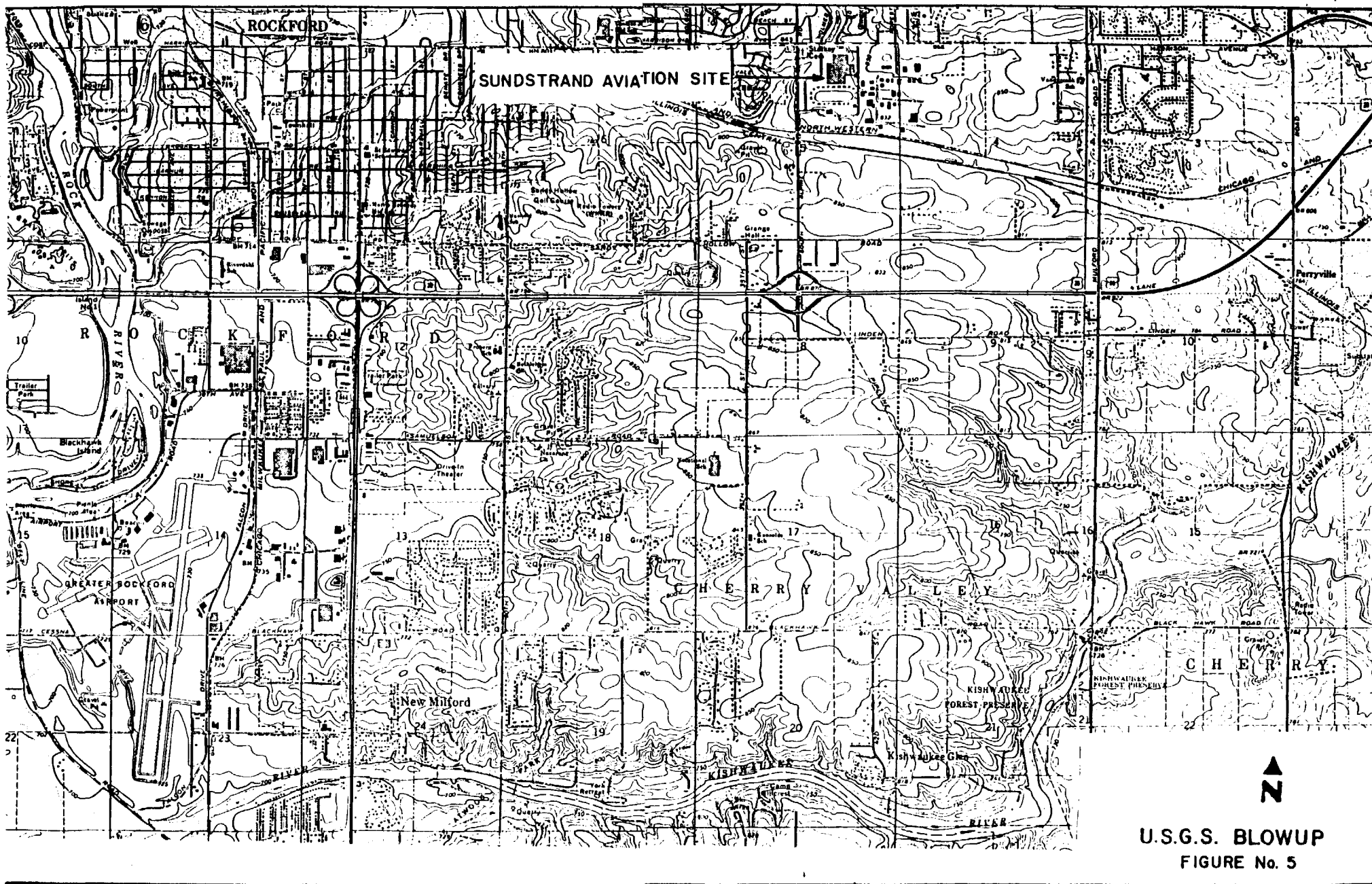
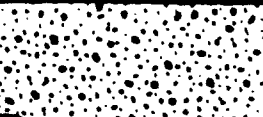

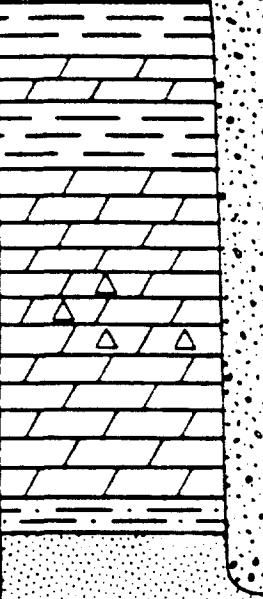
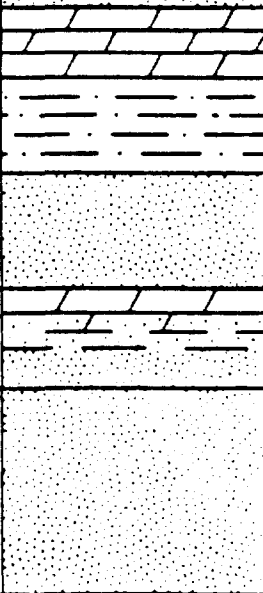



FIGURE No. 4



SYSTEM	GROUP	FORMATION & THICKNESS	GRAPHIC COLUMN
QUATER-NARY 0 - 0.7 m.y. B.P.		0 - 450 ft	
SILUR. 405 - 440 m.y. B.P.		50 ft	
ORDOVICIAN 440 - 490 m.y. B.P.	Maquoketa	150 - 200 ft	
	Galena	250 ft	
	Platteville	100 ft	
	Ancell	Glenwood 5 - 60 ft	
		St. Peter 200 - 400 ft	
CAMBRIAN 500 - 515 m.y. B.P.		Potosi 50 - 100 ft	
		Franconia 50 - 100 ft	
		Ironton - Galesville 75 - 170 ft	
		Eau Claire 350 - 450 ft	
		Mt. Simon 1000 - 1600 ft	
PRECAMBRIAN			

ISGS 1981

Figure 6 Stratigraphic column for Boone and Winnebago Counties (not to vertical scale).

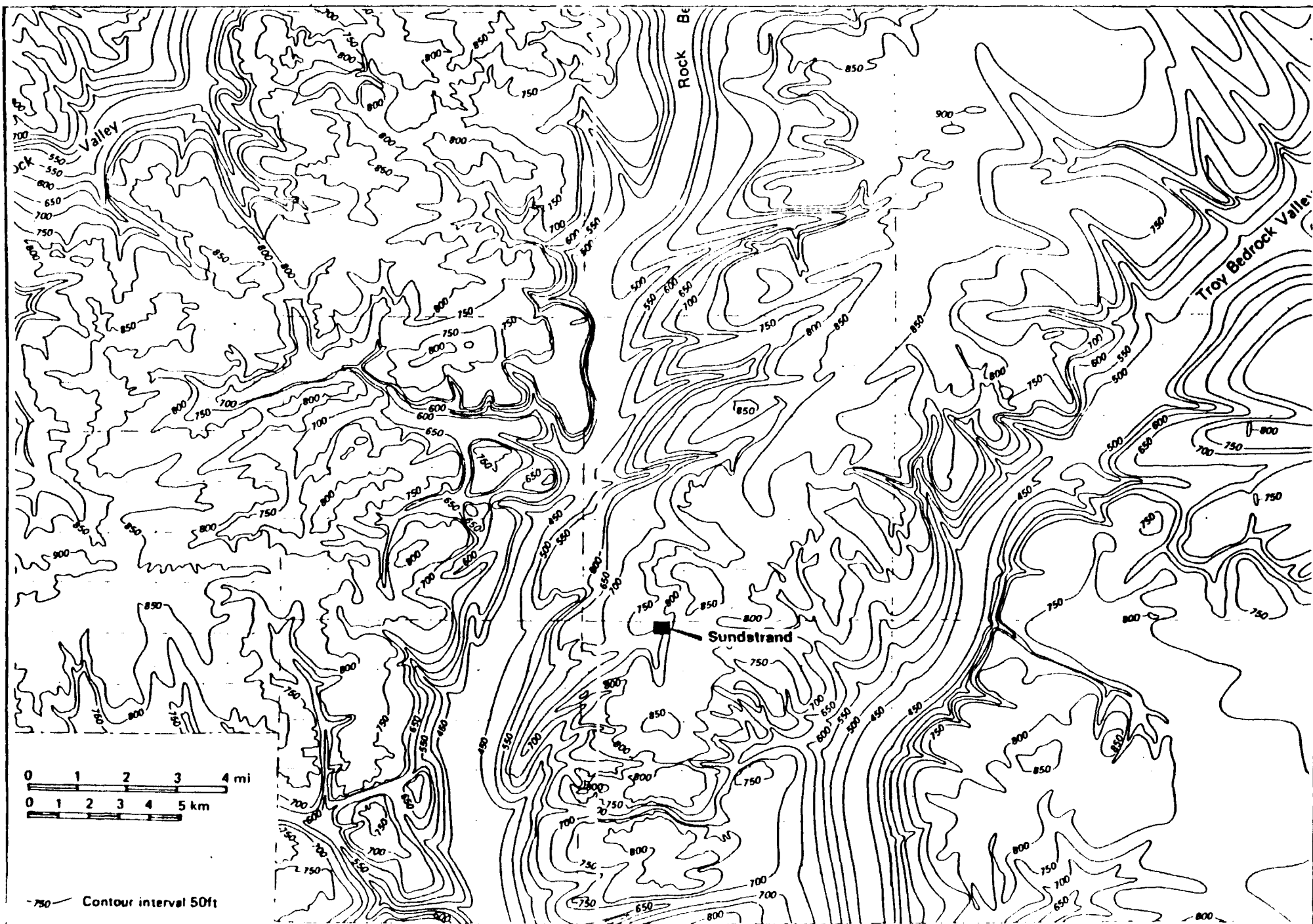
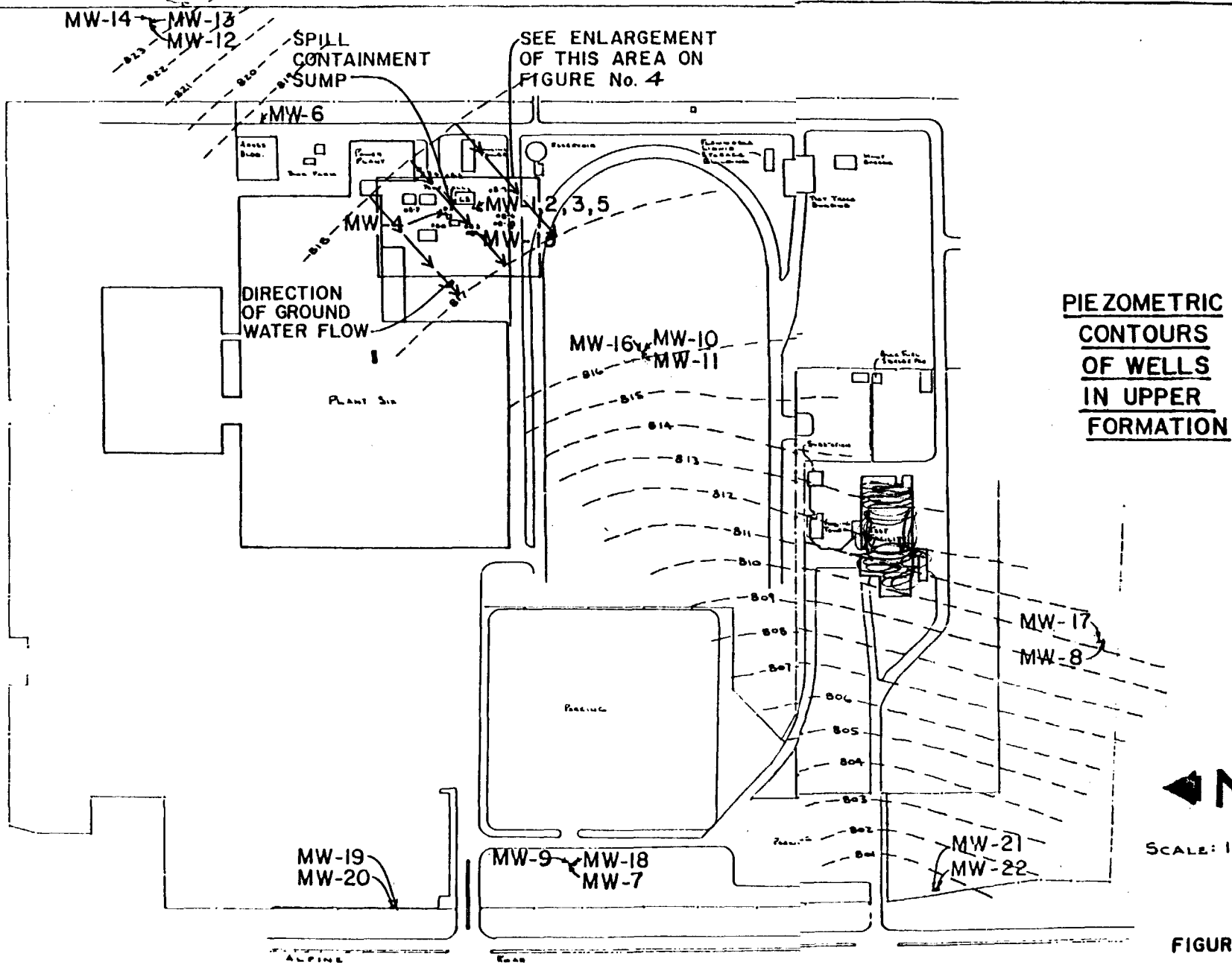
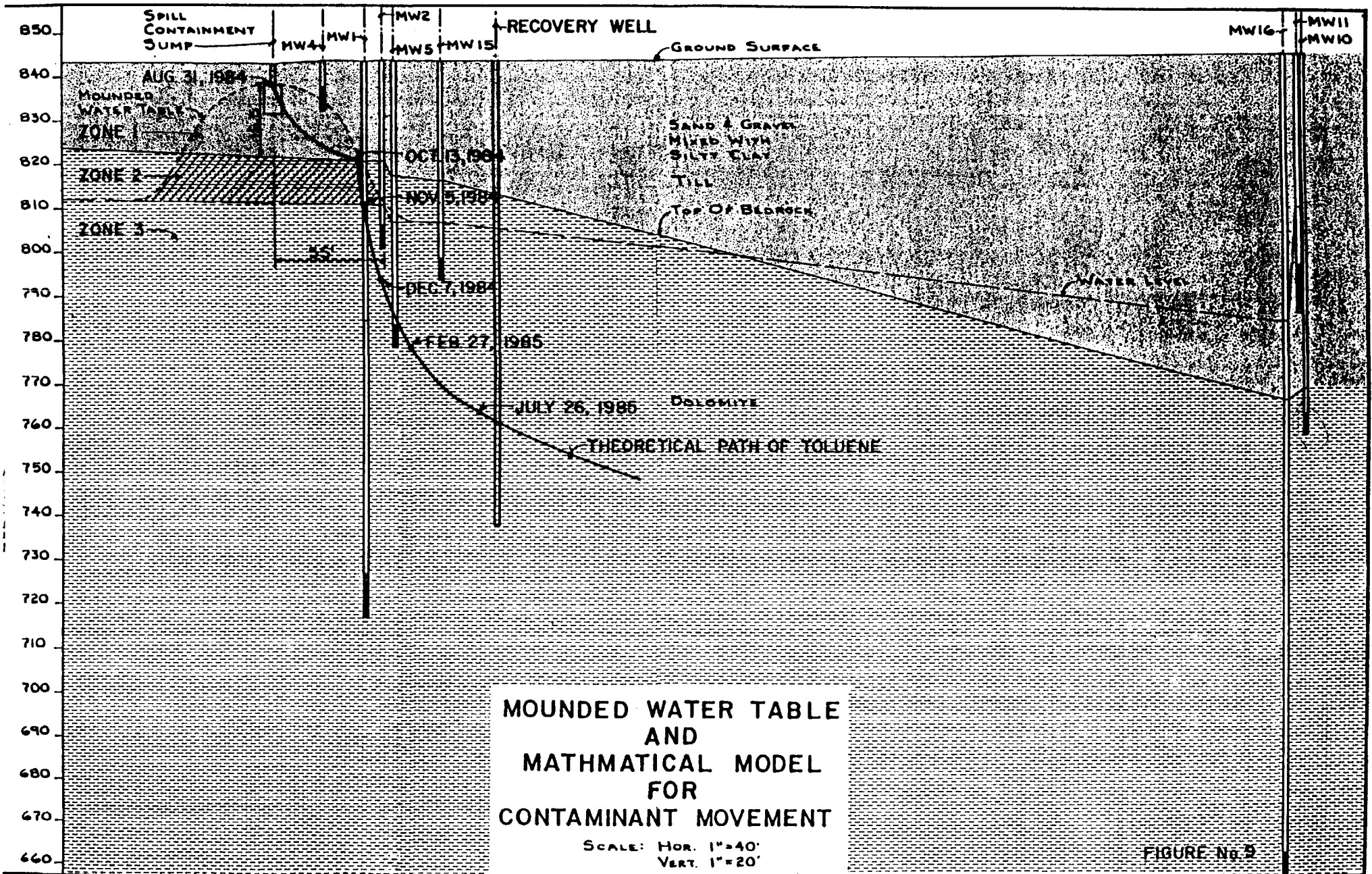


Figure 7 Topography of the Bedrock Surface

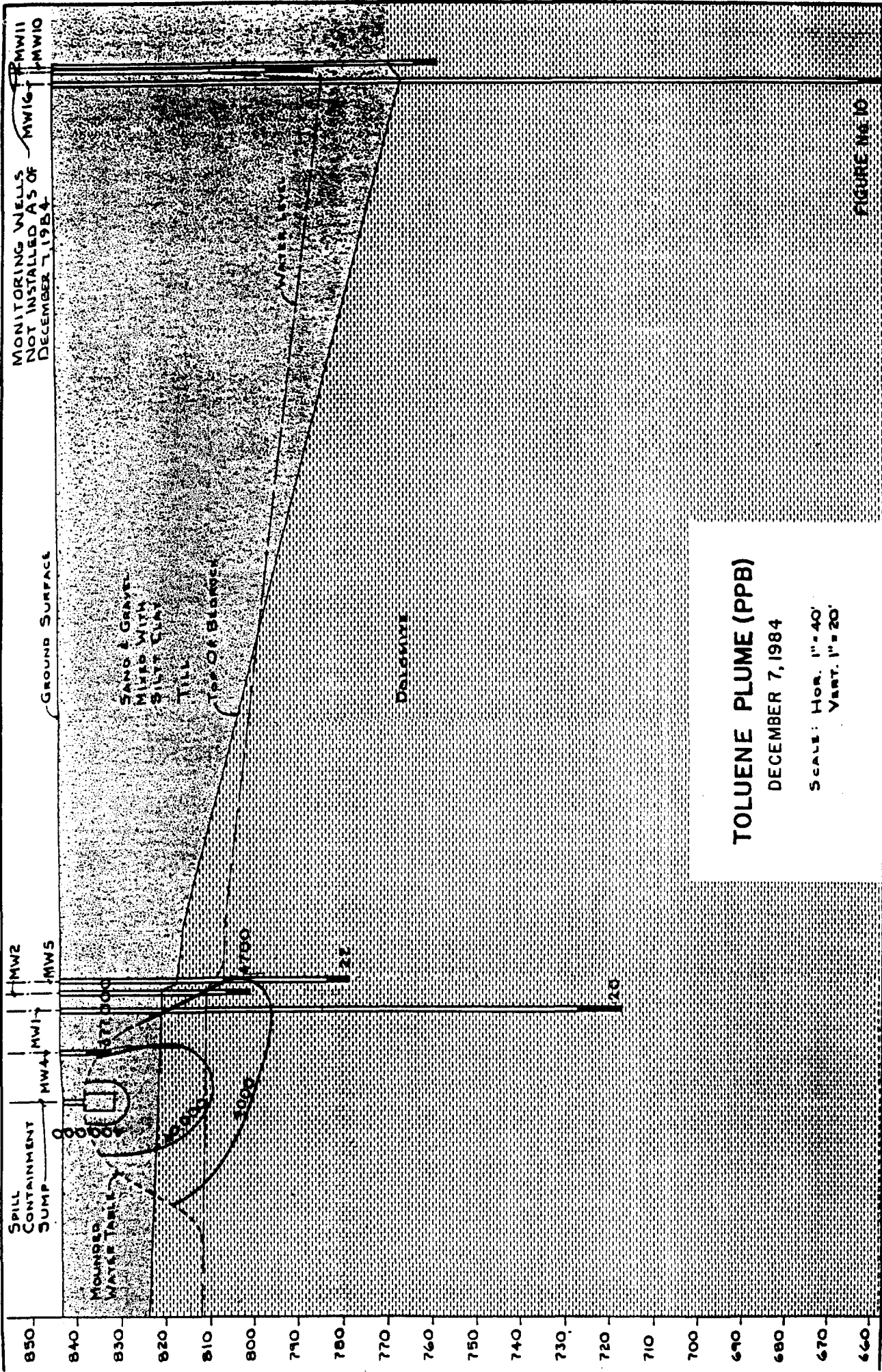
HARRISON AVE.





MONITORING WELLS
NOT INSTALLED AS OF
DECEMBER 7, 1984

SPILL
CONTAINMENT
SUMP



TOLUENE PLUME (PPB)

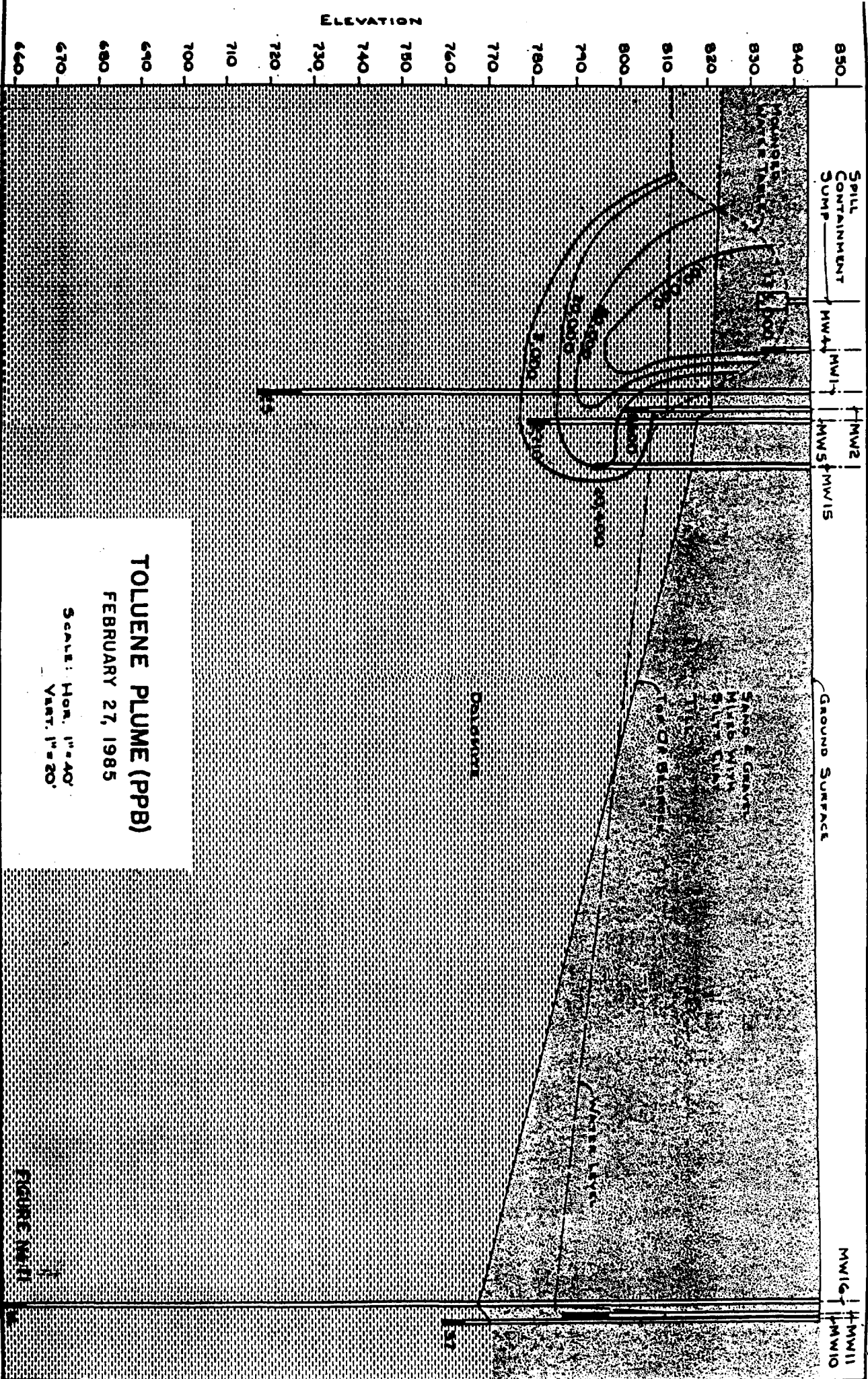
DECEMBER 7, 1984

SCALE: HOR. 1"=40'
VERT. 1"=20'

FIGURE No. 10

ATTACHMENTS

- Soil Boring Toluene Results Attachment No. 1
- Slug Test Results and
Permeability Calculations..... Attachment No. 2
- Monitoring Well Logs and
Water Levels Attachment No. 3
- Laboratory Quality Control Attachment No. 4

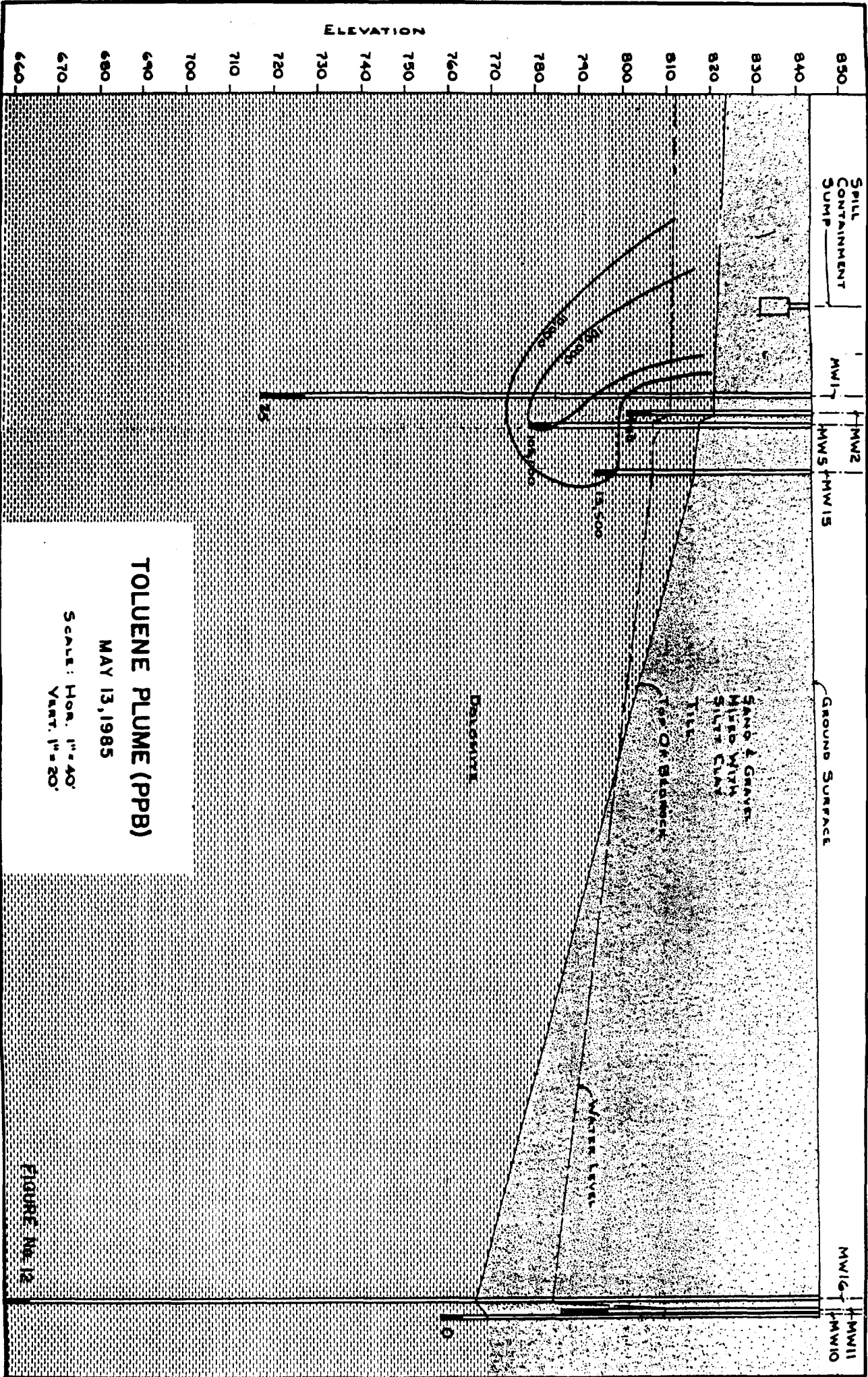


TOLUENE PLUME (PPB)

FEBRUARY 27, 1985

SCALE: HOR. 1"=40'
VERT. 1"=20'

FIGURE MW-11



TOLUENE PLUME (PPB)

MAY 13, 1985

SCALE: HOR. 1"=40'
VERT. 1"=20'

FIGURE No. 12

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

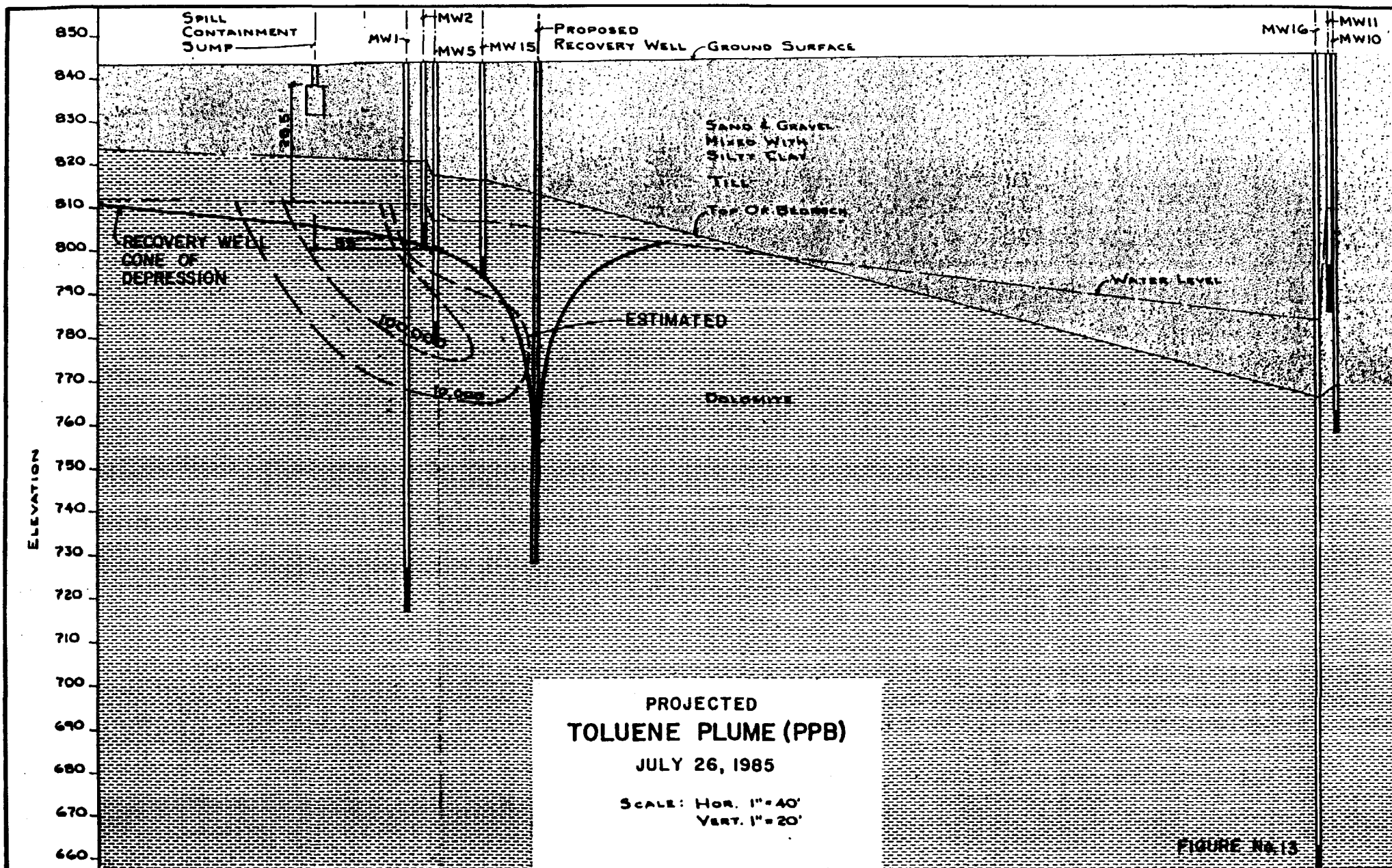
Slug Volume = 4 ft. x 1.66 inch O.D. = 0.060 ft³
= 0.450 Gal.

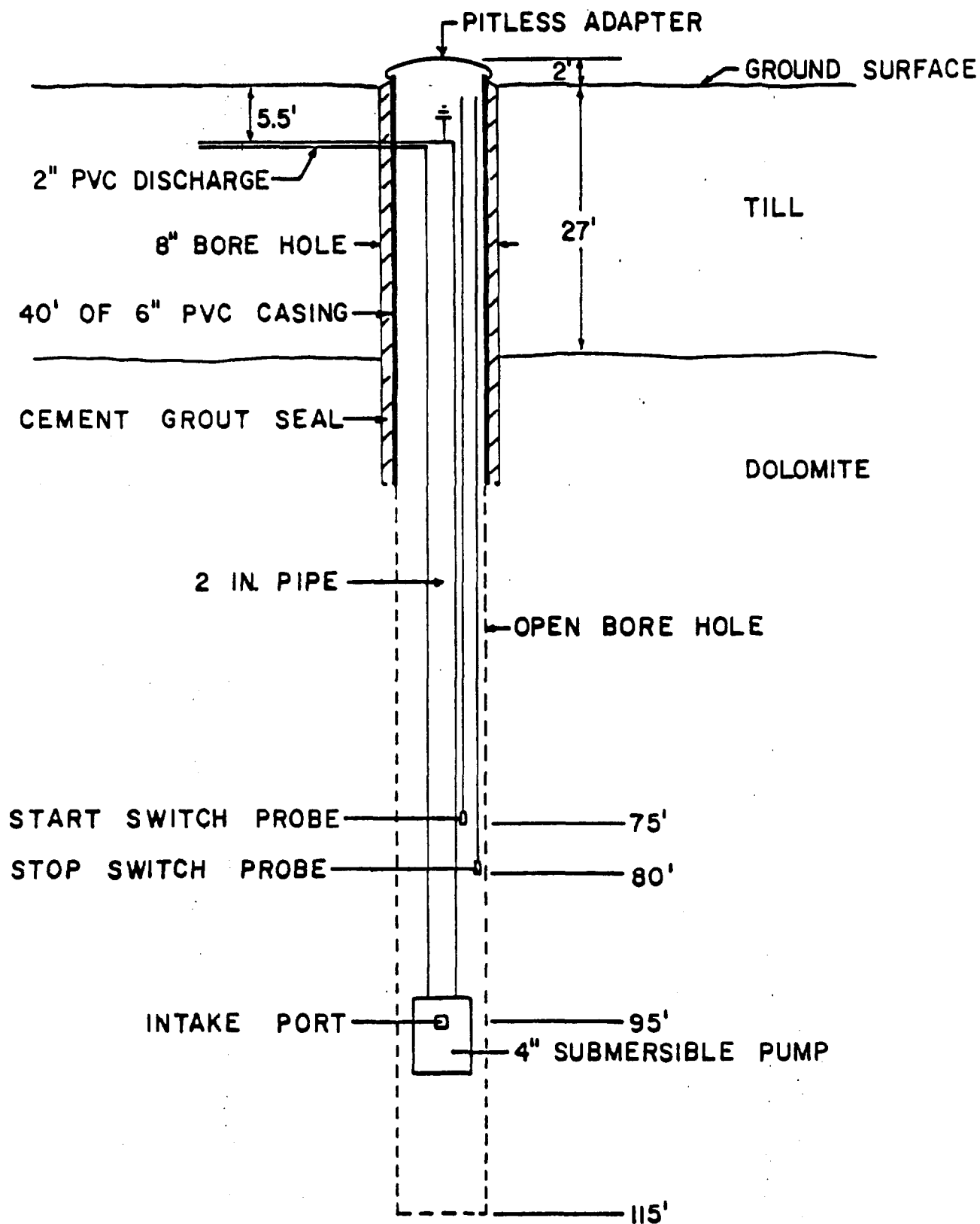
<u>Water Level</u>		<u>Hr.</u>	<u>Time</u> <u>Min.</u>	<u>Sec.</u>
MW-6	29.11 Static			
	26.76 Slug Inserted	0	0	0
	27.01		3	45
	27.26		8	19
	27.51		14	53
	27.76		24	06
	28.01		35	09
	28.26		51	40
	28.77	1	48	15
MW-7	26.73 Static			
	24.72 Slug Inserted	0	0	0
	24.97		0	47
	25.22		1	36
	25.47		2	54
	25.72		3	54
	25.97		6	14
	26.22		10	04
	26.47		14	55

Total Depth MW-6 = 39.82
Total Depth MW-7 = 32.97

December 20, 1984

Fehr, Graham and Associates,





RECOVERY WELL DETAIL

ATTACHMENT NO. 1

SOIL BORING TOLUENE RESULTS

SUNDSTRAND AVIATION
Soil Sampling Summary

<u>Boring B-1 (12/5/84)</u>			<u>Boring B-2 (12/5/84)</u>			<u>Boring B-3 (12/5/84)</u>			<u>Boring B-4 (12/5/84)</u>			<u>Boring B-5 (12/5/84)</u>		
<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>
S-1A	2-4	70												
S-2	4-6	740												
S-3A	6-7	270	S-1	4.5-6	7,200	S-1			S-1			S-1	4.5-6	< 40
S-3B	7-8	170												
S-4A	8-9	150												
S-4B	9-10	< 10												
S-5A	10-11	20,000	S-2	9.5-11	1,300	S-2	9.5-11	100	S-2	9.5-11	140	S-2	9.5-11	
S-5B	11-12	110												
S-6A	12-13	24,000	S-3			S-3, S-7			S-4			S-3	11-12.5	
S-6B	13-14	920										S-4	12.5-14	< 40
S-7A	14-15	7,700												
S-7B	15-15.5	340										S-5	14-15.5	< 40
S-8	23-25	340	S-4	19.5-21	130							S-6	19.5-21	< 40
						S-6	25-26.5	110	S-5	23-24.5	100			

SUNDSTRAND AVIATION
Soil Sampling Summary (contd)

<u>Boring B-6 (12/19/84)</u>			<u>Boring B-7 (12/19/84)</u>			<u>Boring B-8 (12/19/84)</u>			<u>Boring B-9 (12/20/84)</u>			<u>Boring B-10 (12/20/84)</u>		
<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>	<u>Sample No.</u>	<u>Depth (ft.)</u>	<u>Toluene (ppb)</u>
S-1	5-6.5	< 20	S-1	4-5.5	< 20	S-1	4-5.5	< 20	S-1	4-5.5	< 20	S-1	4-5.5	< 20
S-2	9.5-11	< 20	S-2	9-10.5	< 20	S-2	9-10.5	123	S-2	9-10.5	< 20	S-2	9-10.5	69
S-3	11-12.5	< 20	S-3	10.5-12	< 20	S-3	10.5-12	115	S-3	10.5-12	131	S-3	10.5-12	27
S-4	12.5-14	< 20	S-4	12-13.5	< 20	S-4	12-13.5	< 20	S-4	12-13.5	< 20	S-4	12-13.5	160
S-5	14-15.5	< 20	S-5	13.5-15	< 20	S-5	13.5-15	< 20	S-5	13.5-15	< 20	S-5	13.5-15	20
S-6	20-21.5	31	S-6	19-20.5	48	S-6	19-20.5	< 20	S-6	19-20.5	26	S-6	19-20.5	< 20

ATTACHMENT NO. 2

SLUG TEST RESULTS

AND

PERMEABILITY CALCULATIONS

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

Slug Volume = 4 ft. X 1.66 inch. O.D. = 0.060 ft³
= 0.450 Gal.

<u>Water Level</u>		<u>Hr.</u>	<u>Time</u> <u>Min.</u>	<u>Sec.</u>
MW-1				
40.17	Static			
39.14	Slug Inserted	0	0	0
39.94		0	1	40
40.03		0	3	55
40.10		0	14	10
MW-5				
38.35	Static			
35.63	Slug inserted	0	0	0
36.55		0	0	25
37.07		0	1	00
37.32		0	1	22
37.57		0	1	45
37.82		0	2	26
38.07		0	3	26
38.32		0	6	00

Total Depth MW-1 = 129.19 ft.
Total Depth MW-5 = 67.52 ft.

March 8, 1985

Fehr, Graham and Associates

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

Slug Volume = 4 ft. X 1.66 inch. O.D. = 0.060 ft^3
= 0.450 Gal.

<u>Water Level</u>		<u>Hr.</u>	<u>Time</u> <u>Min.</u>	<u>Sec.</u>
MW-13				
39.29	Static			
37.55	Slug Inserted	0	0	0
37.80		0	1	35
38.05		0	2	35
38.30		0	3	40
38.55		0	5	45
38.80		0	7	40
39.05		0	12	54

• Total Depth MW-13 = 67.65 ft.

March 8, 1985

Fehr, Graham and Associates

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

Slug Volume = 4 ft. x 1.75 inch O.D. = 0.066 ft³
= 0.497 Gal.

	<u>Water Level</u>	<u>Hr.</u>	<u>Time</u> <u>Min.</u>	<u>Sec.</u>
MW-2	34.08 Static			
	31.18 Slug Inserted	0	0	0
	31.43		5	29
	31.68		10	20
	31.93		16	13
	32.18		23	40
*MW-4	8.15 Static			
	7.70 Slug Inserted	0	0	0
	7.95		1	52
MW-9	36.97 Static			
	34.17 Slug Inserted	0	0	0
	34.42		**	
	34.67		1	0
	34.92		1	30
	35.17		2	20
	35.42		3	06
	35.67		4	04
	35.92		5	33
	36.17		7	19
*MW-10	43.47 Static			
	42.95 Slug Inserted	0	0	0
	43.20		0	25
	43.45		1	20

* Very Quick Recovery (fully recovered)

** Unable to accomplish first reading

January 7, 1985

Fehr, Graham and Associates

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

Slug Volume = 4 ft. X 1.66 inch. O.D. = 0.060 ft³
= 0.450 Gal.

<u>Water Level</u>		<u>Hr.</u>	<u>Time</u> <u>Min.</u>	<u>Sec.</u>
MW-8				
7.99	Static			
5.57	Slug Inserted	0	0	0
5.80		0	0	35
5.89		0	0	53
6.14		0	1	51
6.39		0	2	32
6.64		0	3	45
6.89		0	5	10
7.14		0	7	12
7.39		0	10	35
7.64		0	15	04
7.89		0	24	30

Total Depth MW-8 = 21.11 ft.

March 8, 1985

Fehr, Graham and Associates

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

Slug Volume = 4 ft. X 1.66 inch. O.D. = 0.060 ft³
= 0.450 Gal.

MW-14	<u>Water Level</u>	<u>Time</u>		
		<u>Hr.</u>	<u>Min.</u>	<u>Sec.</u>
	39.54 Static			
	36.94 Slug Inserted	0	0	0
	37.55	0	0	41
	37.94	0	1	16
	38.19	0	2	00
	38.44	0	2	57
	38.69	0	4	29
	38.94	0	7	05
	39.19	0	12	20
	39.44	0	31	00

Total Depth MW-14 = 102.80 ft.

March 8, 1985

Fehr, Graham and Associates

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

Slug Volume = 4 ft. X 1.66 inch. O.D. = 0.060 ft^3
= 0.450 Gal.

<u>Water Level</u>		<u>Hr.</u>	<u>Time</u> <u>Min.</u>	<u>Sec.</u>
MW-15				
38.15	Static			
35.30	Slug Inserted	0	0	0
35.46		0	1	18
35.57		0	2	18
35.69		0	3	30
35.72		0	4	30
36.00		0	7	00
36.19		0	10	30
36.53		0	15	30
37.01		0	20	50
37.16		0	26	30
37.23		0	31	45
37.43		0	37	00
37.57		0	42	00

Total Depth MW-15 = 52.11 ft.

March 8, 1985

Fehr, Graham and Associate

SLUG TESTS
For
Sundstrand Aviation
Monitoring Wells

Slug Volume = 4 ft. X 1.66 inch. O.D. = 0.060 ft³
= 0.450 Gal.

<u>Water Level</u>		<u>Hr.</u>	<u>Time</u> <u>Min.</u>	<u>Sec.</u>
MW-16				
43.03	Static			
41.52	Slug Inserted	0	0	0
42.59		0	0	20
42.87		0	1	00
43.03		0	1	40

• Total Depth MW-16 = 202.56 ft.

March 8, 1985

Fehr, Graham and Associates

EXAMPLE CALCULATION

Well: MW-5, Tested March 8, 1985

L = 9.1 ft H = 38.35 ft

r = 0.084 ft H₀ = 35.60 ft

R = 0.17 ft Falling Head Test

Field Data

Elapsed Time (sec)	h (ft)	$\frac{H-h}{H-H_0}$
< 0	38.35	--
0	35.60	1.00
25	36.55	0.65
60	37.07	0.47
82	37.32	0.37
105	37.57	0.28
146	37.82	0.19
206	38.07	0.10
360	38.32	0.01

From plot, T₀ = 81 sec (See following page)

$$K = \frac{(0.084)^2 \ln(9.1/0.17)}{(2) (9.1) (81)} = 1.9 \times 10^{-5} \text{ ft/sec}$$

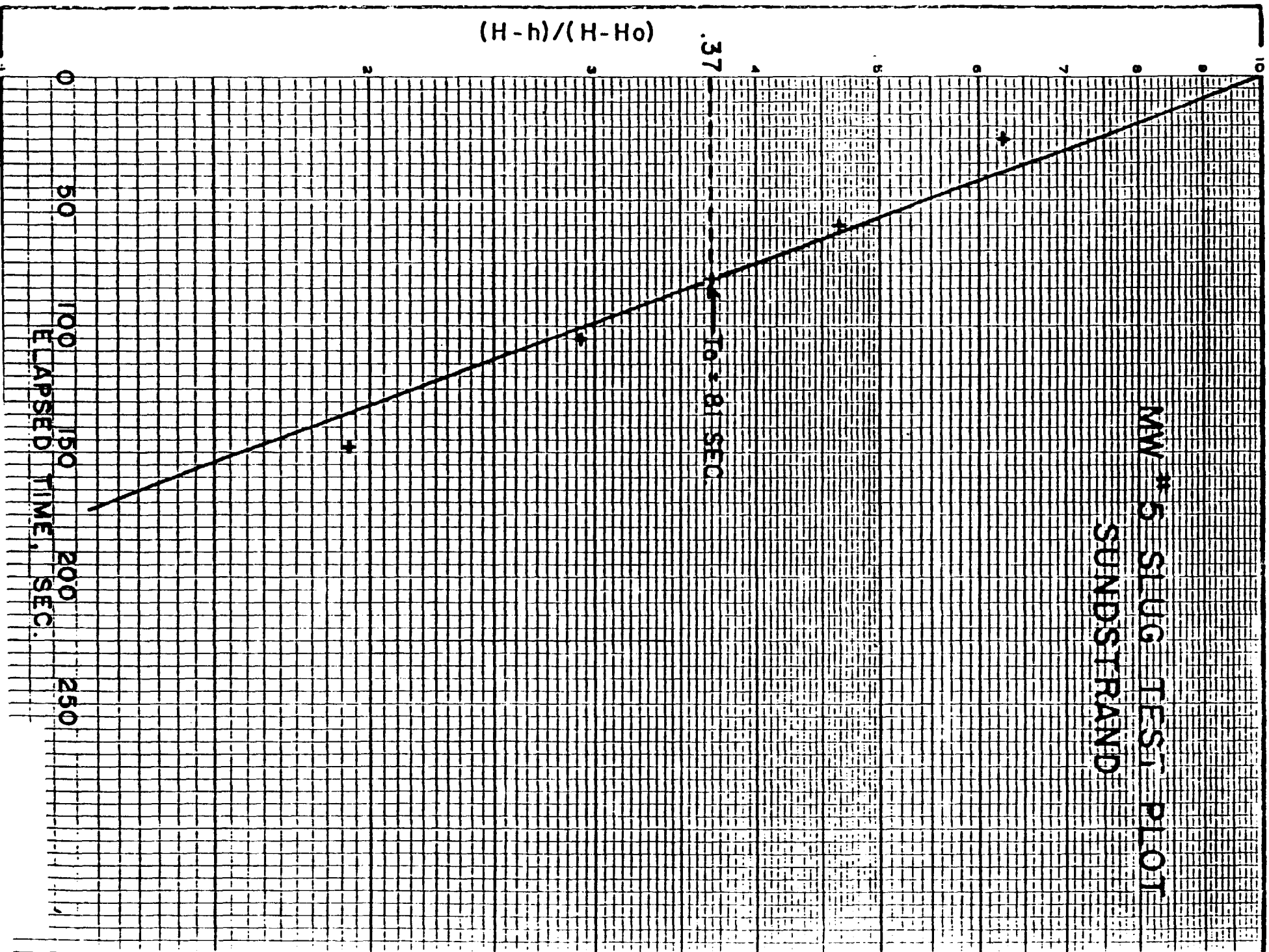
NW #5 SLUG TEST PILOT
SANDSTRAND

$$(H-h)/(H-H_0)$$

.37

$T_0 = 81$ SEC

ELAPSED TIME, SEC.



The preceeding calculation provides the following results:

MW#	Material	Depth(Ft.)	Permeability (Ft/sec)
1	Dolomite	126.6	1.1×10^{-6}
2	Fractured Dolomite	42.5	6.1×10^{-7}
4	Till	11.4	4.0×10^{-5}
5	Dolomite	65.1	1.9×10^{-5}
6	Fractured Dolomite	38.0	4.7×10^{-7}
7	Till	30.6	4.4×10^{-6}
8	Till	19.0	4.1×10^{-6}
9	Fractured Dolomite	52.5	6.0×10^{-6}
10	Dolomite	87.4	9.3×10^{-5}
13	Dolomite	65.6	1.0×10^{-5}
14	Dolomite	100.6	9.0×10^{-6}
15	Dolomite	50.0	1.2×10^{-6}
16	Dolomite	200.6	2.5×10^{-4}

The geometric mean of the permeability in the dolomite formation is 6.0×10^{-6} feet per second.

ATTACHMENT NO. 3
MONITORING WELL LOGS
AND
WATER LEVELS

DRILLING RECORDDate Oct 30, 1984Boring Number MW

Driller

Water Table Information

Bob Wulf

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
16"	1	2 - 4'	3-2-2-4	0-2'	fill of coarse sand and
18"	2	4 - 6'	1-1-1-1		gravel, wet
20"	3	6 - 8'	3-3-4-4	2-4 1/2'	loose brown sand with some
20"	4	8 - 10'	1-1-0-5		gravel, clayey binder, wet
24"	5	10 - 12'	5-3-4-8	4 1/2 - 6 1/2'	Very loose brown sand with
24"	6	12 - 14'	6-10-14-24		some gravel and some clay,
18"	7	14 - 16'	15-34-68	6 1/2 - 9'	Firm brown clayey silt, so
	8*				sand, moist
				9-11' 10"	Loose brown sand and grav
					wet
				11' 10" - 15'	Dense brown clayey silt
					with some sand and gravel,
					damp.
				15 1/2'	Boulder at 15 feet. Driller
					was convinced it was bedrock
					and switched to rock-corin,
					tool. Bedrock was not
					encountered until 25'
Logging Geologist					
Peter J. Vagt					
P. J. Vagt					

DRILLING RECORD

Date 10/31/85

Boring Number MW-1
(Continued)

Driller

Water Table Information

Bob Wolf

[illegible]

DRILLING RECORD

Date 11/5/85

Boring Number MW-2

Driller

Water Table Information

Bob Wolf

[illegible]

DRILLING RECORD

Date 11/5/85

Boring Number MW-3

Driller

Water Table Information

Bob Wolf

[illegible]

DRILLING RECORD

Date 12/3/84

Boring Number MW-4

Driller

Bob Wolf

Water Table Information

Water Level about 10'

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
				4-1/2-6	Sandy loam Glacial till Moist
				9-1/2-11'	Sand & Gravel & Loam Mix Glacial till Wet
					Finished drilling 10:30
				11'	Installed well w/5'
					screen section.
					Added pea gravel to 5'.
					Added 1' of bentonite
					pellets for a seal.
					Mixed a Portland cement
					slurry and brought to
					surface. Placed protective
					cover over well.
Logging Geologist Ken Beach					

DRILLING RECORD

Date 12/3/84

Boring Number MW-5

Driller

Bob Wolf

Water Table Information

[illegible]

DRILLING RECORD

Date 12/4/84

Boring Number MW-6

Driller

Water Table Information

Bob Wolf

[illegible]

DRILLING RECORDDate 12/4/84Boring Number MW-7

Driller

Bob Wolf

Water Table Information

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
14"	5-1	1½-3	7-20-28	1½-3	Sandy silty gravel very dry
18"	5-2	3-4½	21-41-54	3-4½	Sandy silty stone very dry
18"	5-3	4½-6	31-54-46 ^(4½")	4½-6	Sandy silty stone very dry
12"	5-4	6-7	30-71	6-7	Sandy silty stone very dry
18"	5-5	9½-11	26-40-46	9½-11	Sandy silty stone dry
18"	5-6	12-13½	24-35-65	12-13½	Sandy silty stone moist
18"	5-7	14½-16	33-55-45 ^(4")	14½-16	Sandy silty stone dry
10"	5-8	19½-20½	45-55 (4")	19½-20½	Sandy silty sone dry
					Hit water about 28'
				12/5	Set well at 30 1/3'
					(5 foot screen)
					Added gravel to 25'
					Added bentonite pellets
					to 24'
					Cement slurry to top.
Logging Geologist Ken Beach					

DRILLING RECORDDate 12/5/84Boring Number MW-

Driller

Water Table Information

Bob Wolf

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
12"	S-1	1½-3	3-3-5	1½-3	Sandy silty loam moist
10"	S-2	3-4½	3-3-4	3-4½	Sandy clay moist
17"	S-3A	4½-6 4½-4 3/4	4-6-8	4½-4 3/4	Sandy clay very moist
14"	S-3B	4 3/4-6		4 3/4-6	Black silty loam very moist
10"	S-4A	6-7½ 6-7	3-3-4	6-7	Black silty loam very moist
	S-4B	7-7½		7-7½	Sandy clay very moist
11"	S-5	7½-9	3-4-6	7½-9	Fine silty clay very moist
15"	S-6	9-10½	4-4-6	9-10½	Fine silty clay moist
8"	S-7A	10½-12 10½-11½	7-12-11	10½-11½	Fine silty clay moist
	S-7B	11½-12	11-9-7	11½-12	Sandy fine silt very moist
2"	S-8	12-13½	11-9-7	12-13½	Fine silt moist
16"	S-9A	13½-15 13½-14	4-8-12	13½-14	Fine silt very moist
	S-9B	14-15		14-15	Sandy silt wet
18"	S-10	15-16½	9-11-17	15-16½	Sandy silt very wet
18"	S-11A	16½-18 16½-17½	13-22-18	16½-17½	Sandy silt gravel very wet
	S-11B	17½-18		17½-18	Silt & stone very moist
18"	S-12	18-19½	12-20-30	18-19½	Hard sandy-gravel silt moist
					Set bottom of well at
					19'. 5' screen
Logging Geologist					Gravel to 12'. 1' of , bentinite pellets
					Portland cement slurry to surface
Ken Beach					

DRILLING RECORD

Date 12/27/84

Boring Number MW-9

Driller D&G
New Lennox

Water Table Information

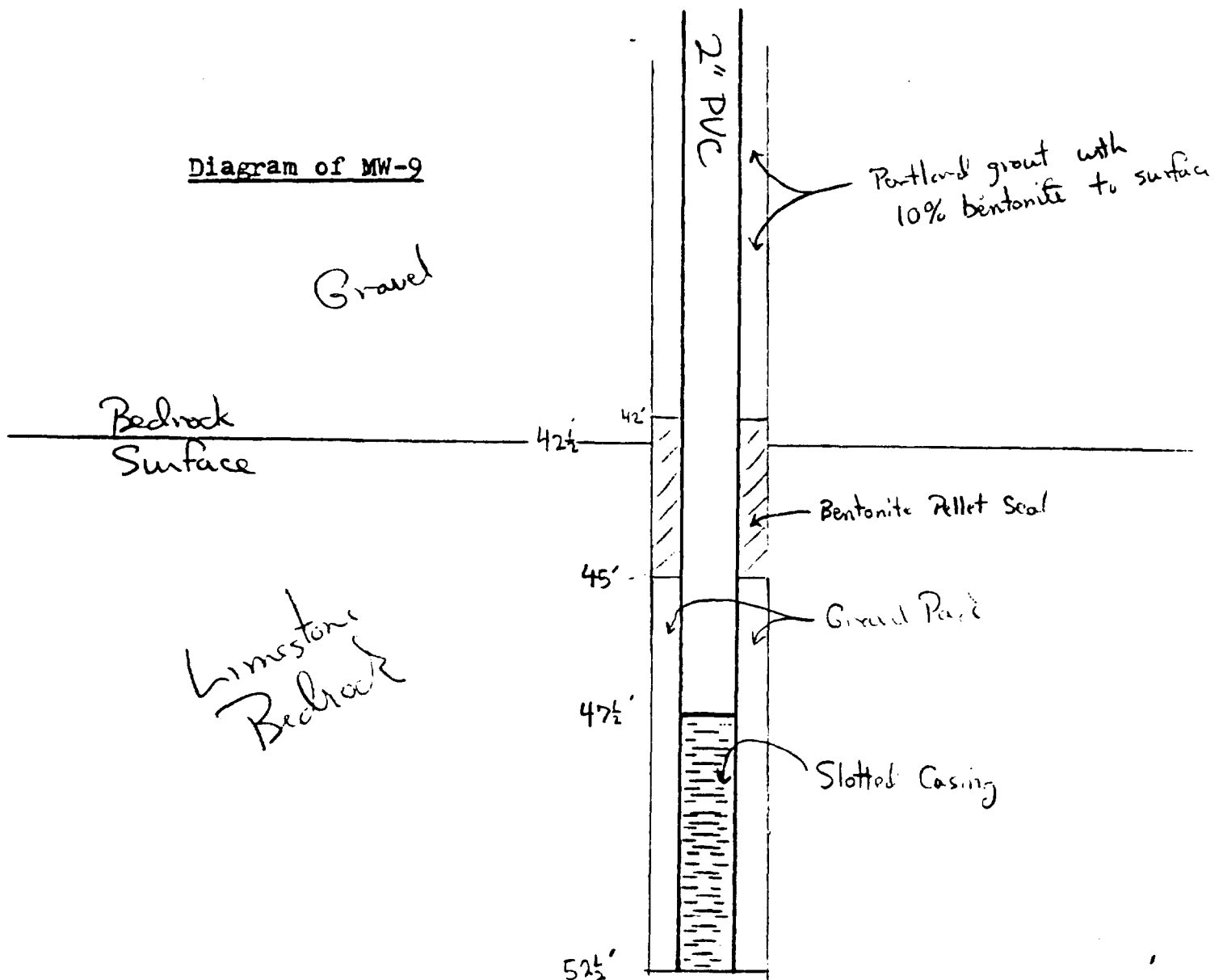
[illegible]

MONITORING WELL NOTES

MW - 9

1. Bore hole made by wash and rotary bit with bentonite mud to depth of $52\frac{1}{2}$ feet.
2. Bottom of 5-foot long, 2-inch diameter PVC screen was set at $52\frac{1}{2}$ feet.
3. Gravel pack was placed from bottom to 45 feet.
4. Bentonite Pellet seal was placed from 45-42 feet.
5. Portland cement grout with 10% bentonite mixture was placed from 42 feet to surface.
6. Steel protective pipe was concreted into place over the well casing.

Diagram of MW-9



DRILLING RECORDDate 12/20/84Boring Number MW-1

Driller

Barry
John
(D & G Drilling)

Water Table Information

A little water at 11'
came into hole.
21½ feet water is setting

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
13"	S-1	4½-6	10-14-16	4½-6	Silty sandy rocky moist
15"	S-2	9½-11	14-17-33	9½-11	Silty sandy rocky moist
18"	S-3	14½-16	23-36-65	14½-16	Silty sandy rocky moist
12"	S-4	19½-21	44-52-50 ^(1")	19½-21	Silty sandy rocky moist
15"	S-5	24½-26	30-44-80	24½-26	Silty sandy rocky moist
6"	S-6	28½-29	100 (6")	28½-29	Silty sandy rocky moist
18"	S-7	33½-35	13-17-20	33½-35	Silty sandy rock very moist
4"	S-8	38½-39	100 (6")	38½-39	Gravel & rock wet
				43'	Hit a rock (changed to a 3" rock bit)
					Went back to a 4" bit and went down to
15"	S-9	48½-50	42-55-50 ^(1")	48½-50	Sand gravel & rock very wet
15"	S-10	53½-55	24-31-32	53½-55	Sand & silt very wet
15"	S-11	58½-60	31-44-48	58½-60	Sand & gravel very wet
18"	S-12A	63½-64½	77-43-17	63½-64½	Sand & Gravel very wet
	S-12B	64½-65		64½-65	Silty (clay?) very wet
17"	S-13	68½-70	17-18-56	68½-70	Sand & gravel very wet
					Boulders down to
					77'. Hit very fractured
					rock. Many voids. Set well
0072-SAM-MW-10	Drilling Mud				at 87' from ground. 5' screen 17' pea gravel 3' bentonite pellets. Portland cement slurry to surface.
Logging Geologist					
Ken Beach					

DRILLING RECORD

Date 12/21/84

Boring Number MW-1

Driller

Barry
John
(D & G Drilling)

Water Table Information

[illegible]

ORIGINAL RECORD

Date 12/27/84 begun
12/28/84 completed

Boring Number MW-12

Driller D & G
New Lennox

Water Table Information

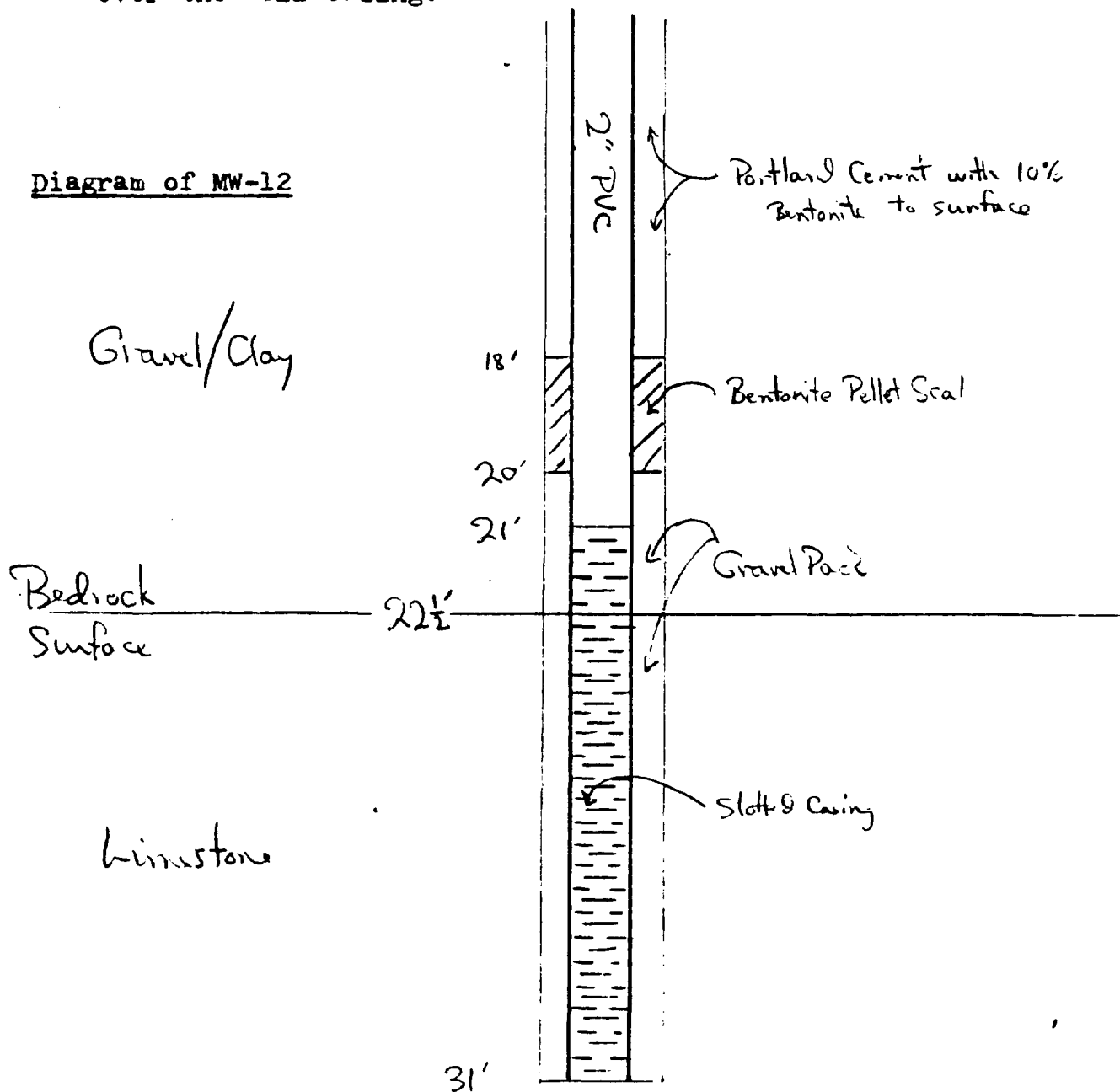
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MONITORING WELL NOTES

MW - 12

1. Bore hole was made by rotary bit with a wash of bentonite mud to depth of 31 feet.
2. Bottom of 10-foot long, 2-inch diameter PVC screen was set at 31 feet.
3. Gravel pack was placed from bottom of casing to 20 feet below ground surface.
4. Bentonite pellet seal was placed between 18 and 20 feet.
5. Portland cement grout with 10% bentonite mixture was placed from 18 feet to the ground surface.
6. Steel protective pipe was concreted into place over the well casing.

Diagram of MW-12



DRILLING RECORD

Date 2/7/85

Boring Number MW-1

Driller

Bob Wolf

Water Table Information

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
				23'	Soil description same as MW-Hit rock very
			2/7 - 50'		fractured to 30'
			2/8/85	65'	to bottom of boring
					installed five foot
					screen on 2" PVC
					well casing. Added
					gravel to 58' Added
					1' of bentonite pellets
					to 57'. Formed a
					bentonite-Portland cement
					slurry and brought
					to 4', by forcing
					to bottom with hose.
			2/13/85		Cement to surface
					and placed protective
					cover over well.

Logging Geologist Kenneth Beach

DRILLING RECORD

Date 2/11-13/85

Boring Number MW-14

Driller

Bob Wolf

Water Table Information

[illegible]

DRILLING RECORDDate 2/15/85Boring Number MW-

Driller

Bob Wolf

Water Table Information

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
					Soil description same as Soil Boring B-10
				27'	Hit rock
					very fractured to
					35'.
				50'	To bottom of boring
					installed five foot
					screen on 2" PVC
					well casing. Added
					gravel to 43'. Added
					1' of bentonite pellets
					to 42'. Formed a
					bentonite-Portland
					cement slurry and
					brought up to 4', by
					forcing to bottom w/hose.
					Cemented to surface
					and placed protective
					cover over well.
Logging Geologist Kenneth Beach					

DRILLING RECORDDate 2/18-21/85Boring Number MW-1Driller
Bob Wolf

Water Table Information

SAMPLING RECORD				LOG	
Sample Recovery	Sample Number	Sample Depth	Blow Count	Depth	Description
				80'	Soil description same as MW-Hit rock
					very fractured to
					90'.
				200'	to bottom of
					boring. Placed a
					5' screen on the
					end of 2" PVC well
					casing. Installed.
					Filled w/gravel
					to 190'. Bentinite pellets
					to 189'. Forced bentinite
					grout to bottom with small
					dia. piping and
					mixed cement with
					bentinite after a
					5' seal. Brought
					slurry up to 4'.
					Cemented to surface
					and placed on
					protective cover.
Logging Geologist Kenneth Beach					

Sundstrand Monitoring Well Water Levels

Well	Date						
	<u>2/27/85</u>	<u>3/13/85</u>	<u>3/22/85</u>	<u>3/26/85</u>	<u>4/5/85</u>	<u>4/11/85</u>	<u>4/23/85</u>
MW-1	804.40	806.07	806.54	806.59	807.20	807.22	807.66
MW-2	810.43	811.33	812.44	812.37	812.82	812.37	813.04
MW-3	---	---	---	---	---	---	---
MW-4	838.17	837.17	---	---	---	---	---
MW-5	806.45	808.15	809.03	808.86	809.51	809.26	809.91
MW-6	814.03	816.80	815.32	817.27	818.28	817.94	818.82
MW-7	807.22	807.89	808.29	808.33	808.66	808.80	808.89
MW-8	812.52	811.43	810.72	810.66	811.57	811.32	810.35
MW-9	797.17	798.42	798.62	798.59	799.12	799.09	799.32
MW-10	803.77	805.47	805.89	806.01	806.60	806.63	806.97
MW-11	809.34	808.34	808.51	808.48	809.36	809.63	816.15
MW-12	823.56	822.69	822.47	822.39	823.31	822.80	823.78
MW-13	814.06	816.56	817.40	817.47	818.65	818.28	819.23
MW-14	813.59	816.28	817.00	817.06	818.26	817.98	818.95
MW-15	806.26	807.98	808.69	808.69	809.31	809.02	809.69
MW-16	803.71	805.49	805.83	805.84	806.59	806.63	806.89

ATTACHMENT NO. 4

LABORATORY QUALITY CONTROL

LABORATORY EQUIPMENT

A substantial investment in laboratory equipment is necessary to properly perform high quality analytical work. AQUALAB is committed to a continuous expansion and upgrading of equipment and capabilities as required to maintain its total service commitment to clients. AQUALAB's present laboratory equipment includes:

H-P 5993b Gas Chromatograph/Mass Spectrometer
PE 703 Atomic Absorption Spectrophotometer
H-P 5840 Gas Chromatograph with ECD & TCD
PE 560 Atomic Absorption Spectrophotometer
Dohrmann DX-20 TOX Analyzer
H-P 5830 Gas Chromatograph with ECD & FID
IL 457 Atomic Absorption Spectrophotometer
H-P 5880 Gas Chromatograph with dual ECD, FID, & NPD
H-P 5880 Gas Chromatograph with ECD & FID
Jarrell Ash 530 Atomic Absorption Spectrophotometer
H-P 5890 Gas Chromatograph with FID
Packard Gas Chromatograph with ECD & FID
Waters 440/441 HPLC with 420 C&E Fluorescence
Dohrmann DC-80 Low Level TOC Analyzer
Sequoia-Turner Model 450 Fluorometer
Coulometrics liquid/solid TOC Analyzer
Nikon Photographing Microscope
Parr Oxygen Bomb Calorimeter System
Hitachi UV-VIS Spectrophotometers
Pye Unicam UV-VIS Spectrophotometer
Perkin Elmer Spectrophotometer

LABORATORY PROCEDURES

AQUALAB analyzes a wide range of sample matrices for a long list of parameters. The types of samples would include: water, foods, cosmetics, sludges, bottom sediments, grains, alloys, tissues, feed additives, hazardous waste, plastics, soils, fertilizers, and many more.

As is the case with all submitted analytical work, AQUALAB utilizes the current approved procedure or the most appropriate methodology. For example, any samples submitted in conjunction with requirements to satisfy U.S. Environmental Protection Agency permits or applications would necessitate use of USEPA methods. Many food products submitted for quality control would use procedures from the Association of Official Analytical Chemists.

Analytical protocols can be specified by the client or the appropriate method will be selected by the laboratory.

The following is a list of the principal agencies and associations that provide analytical method reference sources for laboratories like AQUALAB.

U. S. Environmental Protection Agency
Association of Official Analytical Chemists
American Society of Testing Materials
Institute of Food Technology
AWWA/WPCF Standard Methods Committee
Department of Public Health
U. S. Department of Agriculture

A complete list of reference manuals, books, methods, etc. is available for review in AQUALAB's copyrighted Quality Assurance Manual.

In addition to all of the available reference methods, AQUALAB has written a complete Procedure Manual. This Manual not only gives the complete analytical protocol, but compiles the background information from all of the references and makes it part of the procedure. This would include such information as interferences, pretreatment, holding times, etc.

These detailed procedures in the AQUALAB manual were then summarized onto Procedure Cards. These 5-1/2" X 8-1/2" cards are sealed in plastic to be used by each analyst at the bench. Each person in the lab is trained to utilize these procedure cards rather than rely on memory which can cause long running data errors.

SAMPLE MANAGEMENT

The following is a table from 40 CFR 136, 12/3/79, to be utilized as a guideline for sample containers, preservation of samples, and holding times. This table is extremely important in assuring data reliability. AQUALAB provides all required sample containers, at no extra charge, to control contamination and preservation.

Parameter	Container	Preservative	Maximum Holding Time
Acidity/Alkalinity	P,G	None	14 days
Ammonia	P,G	H ₂ SO ₄ to pH<2	28 days
BOD	P,G	None	2 days
Chloride	P,G	None	28 days
Chlorine	P,G	None	on site
Chromium, hex	P,G	None	2 days
COD	P,G	H ₂ SO ₄ to pH<2	28 days
Color	P,G	None	2 days
Conductivity	P,G	None	28 days
Cyanide	P,G	NaOH to pH>12	14 days
Fluoride	P,G	None	28 days
Hardness	P,G	None	6 months
MBAS	P,G	None	2 days
Mercury	P,G	HNO ₃ to pH<2	28 days
Metals	P,G	HNO ₃ to pH<2	6 months
Nitrate	P,G	None	2 days
Nitrite	P,G	None	2 days
Nitrogen, total	P,G	H ₂ SO ₄ to pH<2	28 days
Oil & grease	G	H ₂ SO ₄ to pH<2	28 days
Organic compounds	G	None	7 days
pH	P,G	None	on site
Phenol	G	H ₃ PO ₄ to pH<2	28 days
Phosphorus	P,G	H ₂ SO ₄ to pH<2	28 days
Radiologicals	P,G	HNO ₃ to pH<2	6 months
Silica	P	None	28 days
Solids, all	P,G	None	7 days
Sulfate	P,G	None	28 days
Sulfide	P,G	Zinc acetate	28 days
Sulfite	P,G	None	2 days
TOC	P,G	H ₂ SO ₄ to pH<2	28 days
TOX	G	None	14 days
Turbidity	P,G	None	2 days

P = Plastic

G = Glass

With the exception of fluoride, metals, and radiologicals, all samples must also be kept at 4C in addition to the preservatives mentioned.

GENERAL DISCUSSION

The purpose of the independent analytical laboratory is to provide information that is accurate, reliable, and adequate for its intended use with absolute impartiality. To meet this purpose, AQUALAB has developed a complete Quality Assurance Program to guide the total operations of our laboratories from shipping of bottles to filing of reports. This program is described in full in our Quality Assurance Manual. This manual is the basis for instruction and direction in the establishment and maintenance of AQUALAB'S Quality Assurance Program. It describes the criteria, guidelines and recommendations for the physical resources, the human resources, the data validation and the mode of operation of the laboratory. Management, statistical, preventative, corrective, administrative, and investigative techniques are employed to maximize this achievement.

AQUALAB's copyrighted Quality Assurance Manual is representative of our great investment in total quality assurance. Therefore, we consider much of its content proprietary. While a manual is available for inspection and review at each of AQUALAB's offices, copies will only be allowed to leave the office when the party makes a request in writing and agrees to sign our release form.

The following table of contents from our Quality Assurance Manual gives a listing of all sections that are covered. As can be seen, AQUALAB has invested in an extensive program which covers every aspect of laboratory operations.

1. INTRODUCTION
2. QUALITY ASSURANCE OVERVIEW
3. ORGANIZATION FOR QUALITY
4. COSTS AND BENEFITS
5. TRAINING AND CERTIFICATION
6. PROCEDURE MANUALS
7. FACILITIES
8. PROCUREMENT CONTROL, REAGENTS AND REFERENCE STANDARDS
9. MAINTENANCE AND CALIBRATION
10. PACKING AND SHIPPING
11. DOCUMENT CONTROL
12. DATA HANDLING, REPORTING AND RECORDKEEPING
13. CUSTOMER RELATIONS
14. CALIBRATION CURVES
15. PRECISION, ACCURACY, AND PERCENT RECOVERY
16. INTERLABORATORY TESTING
17. DATA VALIDATION AND REVIEW
18. CLOSED LOOP CORRECTIVE ACTION AND FEEDBACK
19. AUDITS
20. REFERENCES

Q. A. MANUAL SUMMARY

In order to obtain a clearer picture of AQUALAB's commitment to quality, the following summary of each section is provided. For a more detailed review of our program, we invite you to meet with one of our Division Managers at your nearest Aqualab office.

SECTION 2. QUALITY ASSURANCE OVERVIEW

This section was written to provide a general overview of our Quality Assurance Program. This summary allows the reader to obtain a total picture of our program without reading the entire Q. A. Manual.

SECTION 3. ORGANIZATION FOR QUALITY

The establishment of a quality assurance program, as described in our Quality Assurance Manual, requires the assistance of all the people within AQUALAB to carry out the monitoring, recordkeeping, statistical techniques and other functions required by our system. This total commitment of all personnel to the production of reliable data is dependent upon the conscientious effort of everyone involved. Therefore it is important that each member of the organization have a clear understanding of his or her duties, responsibilities and their relationship to the company-wide effort. This section assists in that understanding by giving a structure and organization to this commitment to quality. Organization charts for the corporation and the divisions along with job descriptions for all personnel are provided.

SECTION 4. COSTS AND BENEFITS

Quality assurance costs are segregated and recorded to identify elements of our quality assurance program whose costs may be disproportionate to the benefits derived. This assists in carrying out policies in the most efficient and economical manner commensurate with continued accuracy and precision of the data produced. Simply stated - what are the real costs associated with our QA program in relationship to the benefits.

SECTION 5. TRAINING

The most important element in providing quality data is our people. Therefore it is vital to make sure every employee is thoroughly knowledgeable in their area of responsibility and can demonstrate competence on a regular basis in documented form. To attain this, we have a formal training program which not only insures that every employee knows what they're doing, but generates confidence that our analytical results are correct. This mandatory training program covers all aspects of our operation, including extensive training in quality assurance and safety.

SECTION 6. PROCEDURE MANUALS

A quality assurance program should assure that all work, from the ordering of materials to the reporting of results, be prescribed in clear and complete written instructions of a type appropriate to the circumstances. Manuals are not only written for our analytical testing programs but also for such aspects of our operation as maintenance, calibration, reporting, quoting, and invoicing. Procedure cards, when appropriate, have been developed for immediate reference.

SECTION 7. FACILITIES

Because of the extent to which the laboratory environment can effect the results of the analysis, the laboratory facility must be carefully planned and that plan periodically evaluated. In general, the physical conditions shall comply with applicable local building codes, OSHA requirements, EPA requirements, and/or other legal requirements. Emphasis will be placed on professionalism, efficiency, and safety.

SECTION 8. PROCUREMENT CONTROL, REAGENTS, AND REFERENCE STANDARDS

The quality of our reagents and chemicals can directly effect the quality of our analytical results. Described in this section are the procedures for ordering, receiving, marking, and storing materials, reagents, and chemicals. Minimum standards are specified to insure that these supplies do not jeopardize the quality of our analytical results.

SECTION 9. MAINTENANCE AND CALIBRATION

Because we rely so heavily on our instruments, it is the purpose of this section to assure that only properly maintained and calibrated instruments and equipment are used in the measurement process. Preventive maintenance is an orderly program of positive actions (equipment cleaning, lubricating, adjusting, reconditioning, and/or testing) to prevent instruments from failing during use. Calibration is the process by which a standard or piece of equipment of a given accuracy is compared against a standard or piece of equipment of a higher accuracy. Adjustments are made as necessary to assure that the standards or equipment are within the prescribed accuracy.

SECTION 10. PACKING AND SHIPPING

Because of the fragile and sometimes sensitive nature of samples and their containers, special precautions must be taken for handling, storage, packing and shipping to protect the integrity of the samples and to minimize damage, loss, deterioration, degradation, and/or modification. This section addresses acceptable sample containers, sample volumes, preservatives, holding times, chain of custody procedures, DOT shipping regulations, and the disposal of samples.

SECTION 11. DOCUMENT CONTROL

Sound procedural documentation of laboratory operations - from dishwashing and balance calibration to maintenance and analytical testing - are essential to overall quality control. Inaccurate or outdated procedures within a facility can cause severe quality problems. It is the purpose of this section therefore, to describe the system we use to ensure that current specifications, methods, and standards are in the hands of users and that they do not use obsolete documents. A system of distribution, review, approval, recall, and update is established and rigidly utilized.

SECTION 12. DATA HANDLING, REPORTING AND RECORDKEEPING

Essential to our business and clients is a systematic approach to our handling of the large amount of data we generate. This system should allow for rapid information recovery and access. It should also allow for the maintenance and the storage of this data for future

reference. It is the purpose of this section therefore to describe the system and the forms that are used to request, record, transcribe, report, and store the results of our analytical testing.

SECTION 13. CUSTOMER RELATIONS

Vital to our business is the establishment of a good working relationship with our clients. To assist in maintaining that relationship on a professional level, guidelines are established concerning turn-around time, emergency requests, customer complaints, and our rerun policy.

SECTION 14. CALIBRATION CURVES

Calibration curves are plots of the instrument response versus the concentration. 90% of the analyses we perform are based on a calibration curve and the validity of our data is dependent to a great degree on how well these are established. Since it would be impractical to develop a new standard curve every time an analysis is performed, we have established a method for verifying it with each set of samples. It is the purpose of this section to describe how calibration curves are developed and to establish the methods for their verification on a daily basis.

SECTION 15. PRECISION, ACCURACY, AND PERCENT RECOVERY

Our precision, accuracy, and percent recovery program is a continuing, systematic, in-house regimen intended to ensure the production of analytical data of continuing high validity. This is accomplished primarily by running precision, accuracy, and percent recovery control checks with every sample set. Control charts have been developed at the 99% confidence limit to plot this data as it is generated.

SECTION 16. INTERLABORATORY TESTING

The interlaboratory control program involves analysis of check samples (EPA, USGS, ERA, etc.) by each division laboratory in order to assess the continuing capability and relative performance of each. This program shall not be limited to check samples from the corporate office. Check samples from clients, EPA surveys, USGS surveys, certification programs, etc. are also analyzed.

SECTION 17. DATA VALIDATION AND REVIEW

This section describes the process whereby data are screened, and accepted or rejected based on a set of criteria. This involves a critical review of a body of data in order to locate dubious values. It may involve only a cursory scan to detect extreme values or a detailed evaluation requiring the use of a computer. Included in this section are anion-cation balances, chemical relationships, etc.

SECTION 18. CLOSED LOOP CORRECTIVE ACTION AND FEEDBACK

Experience has shown that most problems will not disappear until positive action has been taken by management. The significant characteristic of any good management system is the step that closes the loop - the determination to make a change if the system demands it. This section establishes a mode for correcting a deviation, fixing responsibility for the action required, documenting the steps taken, and securing a report on the resolution of the problem.

SECTION 19. SYSTEM AUDITS

Our QA Program dictates a number of steps, procedures, and documentations that must be followed in order to ensure the accuracy and reliability of our results. All that is needed then, is a follow-up system to ensure that all items dictated in this manual are being carried out. This section describes the three different auditing systems that we use. 1.) Divisional - each division manager is required to do an internal audit at least every quarter. 2.) Corporate - auditing is performed by the Vice-President of Laboratory Operations at least annually. 3.) Other - These audits are performed by our clients or regulatory agencies as needed to satisfy their own QA programs or as a prerequisite to obtaining a specific job or certification.

Sundstrand Aviation Operations

Advanced Technology Group
Sundstrand Corporation



4747 HARRISON AVENUE, P.O. BOX 7002, ROCKFORD, ILLINOIS 61125-7002 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 25-7440

OK

August 29, 1988
EPA88-033

Mr. Steve Colantino
Illinois Environmental Protection Agency
Division of Land Pollution Control
2200 Churchill Road
Springfield, Illinois 62706

Reference: 2010300038--Winnebago County
Sundstrand Corporation - Aviation Division
Superfund/Technical Report

Dear Mr. Colantino:

On the following pages please find the second annual report for the Toluene Remedial Action Program at our 4751 Harrison Avenue, Rockford, Illinois location.

The air stripping tower continues to be effective in removing the toluene contamination. An average monthly flow through the tower of 91,126 gallons of water is being successfully treated at a greater than 99.9% efficiency rate as depicted in the attached graph.

The monitoring well sample data also lends credence to the fact that our remedial action program is working. These results are also summarized in the following paragraphs and the attached graphs and sample sheets which were provided by Fehr-Graham and Associates.

MW4A continues to show high levels of toluene contamination, indicating the existence of possible free product or at least high concentrations of absorbed toluene in the soil matrix. The 350 ppm concentration in this well is probably near the saturation limit for this compound in groundwater. The saturation limit for this compound under laboratory conditions at 20° C is 515 ppm. Solubility under naturally occurring conditions will tend to be somewhat less than this value. This is another possible indication of the presence of free product in this area. The flushing system continues to operate in the area of this well and could also be contributing to these high values.

MW15 has shown a gradual rise in concentrations over the course of the past year. This well is completed in rather impermeable sediments and is the well nearest the spill site, other than MW4A. This phenomenon would appear to indicate that the spill site is continuing to act as a source of contamination of the groundwater. MW15 is located downgradient of the spill site, and any water moving through this area will be expected to be captured by the downgradient purge well which is located downgradient of MW15.

MW5 showed a high level of contamination during the July, 1987, sampling event. This may have just been a discreet slug moving through the system as the other sample results tend to confirm the previously indicated cleanup trend.

The downgradient wells, MW24, MW25, MW26, AND MW10, have continued to show very low to undetectable toluene concentrations. MW24 has shown a pronounced cleanup trend during the course of the program with the May 1988 sample showing no toluene above the 1 ppb detectable limit. MW25 has shown no detectable levels of toluene since pumping was initiated, and the 2 furthest downgradient wells, MW10 and MW26, have never shown any levels of toluene above detection limits. This is an indication that the toluene remedial activity is continuing to effectively arrest the spread of the toluene plume.

If you have any questions or need additional information please call me at (815) 226-6934.

Sincerely,

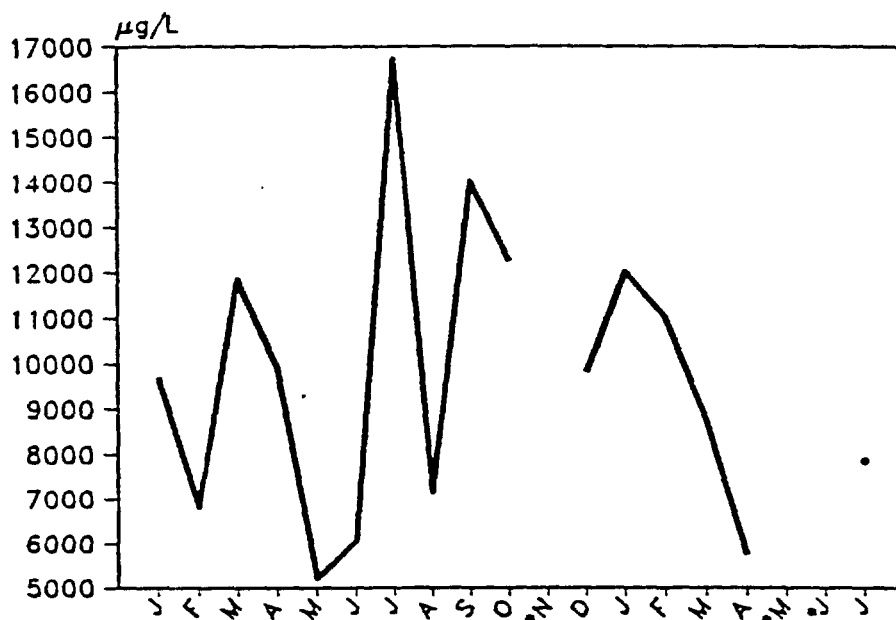


Al Munn
Supervisor ATG Loss Control

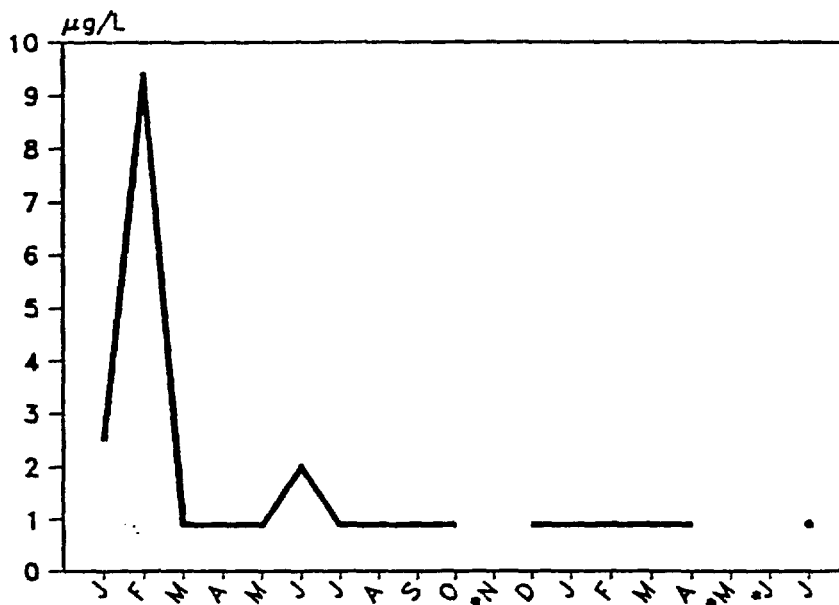
AM/jw

Air Stripping Tower Performance TOLUENE

Combined Influent $\mu\text{g/L}$ (ppb)



Effluent $\mu\text{g/L}$ (ppb)



1987 * = No Samples taken 1988
For that Month

MONITORING WELL NO. 24

SAMPLE RESULTS

PROJECT Sandstrand JOB NO. 26143

BOTTOM ELEVATION 768.6 GEOLOGICAL FORMATION Dalmanite

PARAMETER	DATE	DATE	DATE	DATE	DATE	DATE
	3/17/86	3/20/86	3/27/86	4/3/86	5/7/86	6/10/86
water level	804.01	802.76	803.14	803.20	804.03	802.79
Toluene	17ppm	19ppm	5ppm*	29ppm	26ppm	32ppm
Temperature °F	53.0	52.3	52.8	53.7	54.0	55.2
	7/11/86	8/25/86**	9/25/86	1/3/87	4/9/87	7/21/87
water level	802.99	804.38	801.67	802.35	800.54	801.05
Toluene	8ppm	2ppm	5ppm	128ppb	307ppb	820ppb
temperature °F	55.0	54.5	55.1	51.0	53.9	55.2
	11/10/87	2/1/88	5/13/88			
water level	801.77	804.57	803.15			
Toluene	47ppb	8.6ppb	<1ppb			
temperature °F	52.9	50.1	54.6			
*false reading						

* false reading
** 1.7 standard deviation

MONITORING WELL NO. 25

SAMPLE RESULTS

PROJECT Sevin Strand JOB NO. 26143

BOTTOM ELEVATION 706.3 GEOLOGICAL FORMATION Dolomite

PARAMETER	DATE	DATE	DATE	DATE	DATE	DATE
	3/13/90	3/20/90	3/27/90	4/3/90	5/7/90	** 6/10/90
Water level	805.46	804.45	804.50	804.75	804.60	804.32
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb
temperature °F	52.3	51.0	51.2	52.8	53.0	54.5
	7/11/90	** 8/25/90	9/25/90	11/8/90	4/9/97	7/21/97
Water level	803.43	803.07	802.44	802.49	800.09	800.45
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<1ppb
temperature °F	54.1	53.9	54.8	50.9°	53.0	54.5
	11/10/97	2/1/98	5/25/98			
Water level	801.15	805.46	803.17			
toluene	<1ppb	<1ppb	<1ppb			
temperature °F	51.9	50.4	53.5			
** Air stopped flow						

PROJECT Serial strand

JOB NO. 26143

BOTTOM ELEVATION 805.1

GEOLOGICAL FORMATION Dolomite

	DATE	DATE	DATE	DATE	DATE	DATE
PARAMETER	3/13/98	3/24/98	3/27/98	4/3/98	5/7/98	6/10/98
water level	813.89	812.85	813.49	814.51	815.28	816.64
Toluene	218ppm	372ppm	227ppm*	433ppm	591ppm	372ppm
Temperature °F	53.5	53.0	55.1	55.2	57.4	59.2
	7/11/98	8/27/98**	9/27/98	11/8/98***	bailer 4/9/99	7/21/99
water level	814.26	813.76	815.77	812.01	806.60	810.39
toluene	241ppm	260ppm	283ppm	—	272ppm	20.2ppm
temperature °F	—	61.9	61.2	—	—	—
	11/10/98	11/1/98	5/25/99			
water level	814.34	813.93	814.77			
toluene	73.9ppm	350ppm	203ppm			
temperature °F	—	—	57.7			
*Toluene in Rain						

Air Strippers down

Pun and Miller wanted to go down well

MONITORING WELL NO. 26

SAMPLE RESULTS

PROJECT Sanilstrand JOB NO. 26143

BOTTOM ELEVATION 749.1 GEOLOGICAL FORMATION Dolomite

PARAMETER	DATE	DATE	DATE	DATE	DATE	DATE
	3/13/92	3/20/92	3/27/92	4/3/92	5/7/92	** 6/10/92
Water level	806.07	804.95	805.06	805.71	804.94	806.94
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb
Temperature °F	52.1	51.8	51.9	52.8	53.2	54.7
	7/11/92	** 8/25/92	9/25/92	11/21/92	4/9/97	2/21/97
Water level	804.20	804.60	803.11	803.74	801.09	801.13
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<1ppb
Temperature °F	54.8	53.6	55.8°	48.2°	53.1	54.2
	11/12/97	2/1/98	5/25/98			
Water level	802.27	804.50	803.97			
toluene	<1ppb	<1ppb	<1ppb			
Temperature °F	51.2	49.5	-			
** Air sample down						

MONITORING WELL NO. 10

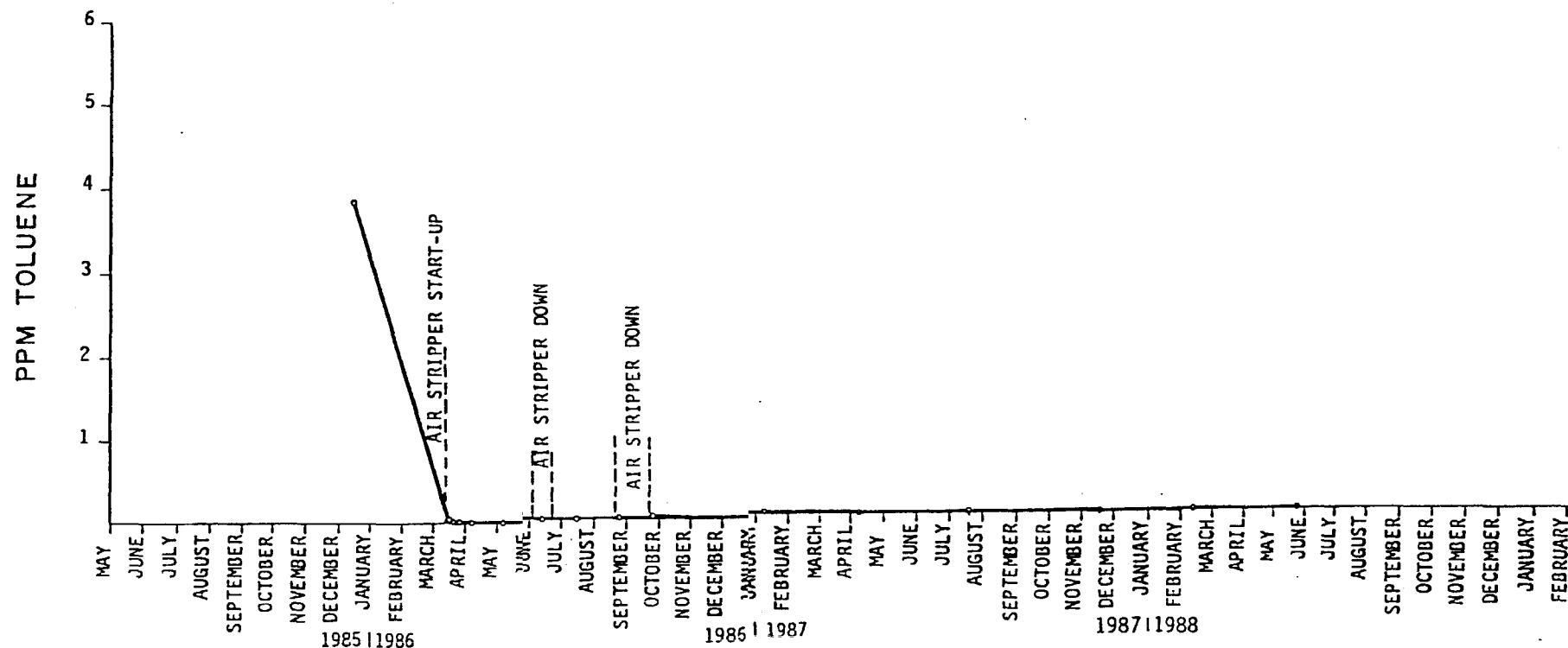
SAMPLE RESULTS

PROJECT Sunil stream JOB NO. 26143

BOTTOM ELEVATION 757.85 GEOLOGICAL FORMATION Dolomite

PARAMETER	DATE	DATE	DATE	DATE	DATE	DATE
	3/13	3/20/96	3/27/96	4/3/96	5/2/96	6/10/96
water level	807.37	806.50	806.68	806.54	805.71	806.79
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb
temperature °F	51.0	48.8	49.0	51.7	52.5	54.0
	7/11/96	8/25/96	9/25/96	1/5/97	4/9/97	7/21/97
water level	805.69	804.64	804.47	804.70	802.74	802.00
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<1ppb
temperature °F	57.1	54.4	55.4	50.0	52.4	55.0
	11/14/97	2/11/98	5/25/98			
water level	803.74	804.71	805.79			
toluene	<1ppb	<1ppb	<1ppb			
temperature °F	51.1	—	53.1			
*** Air stopped down						

MW 25



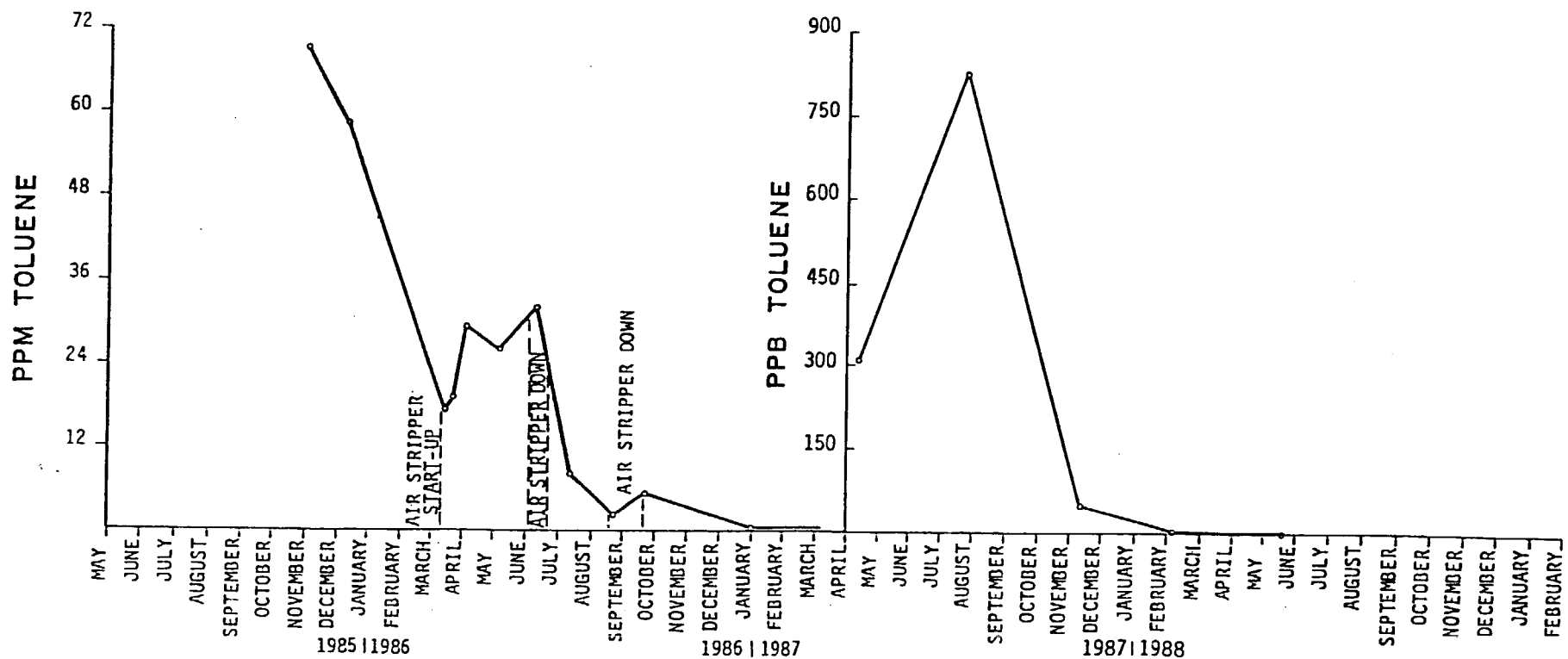
SUNDSTRAND AVIATION TOLUENE REMEDIAL ACTION RESULTS

7/27/88



FEHR-GRAHAM & ASSOCIATES
ENGINEERING AND SCIENCE CONSULTANTS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643 61032-5098

MW 24



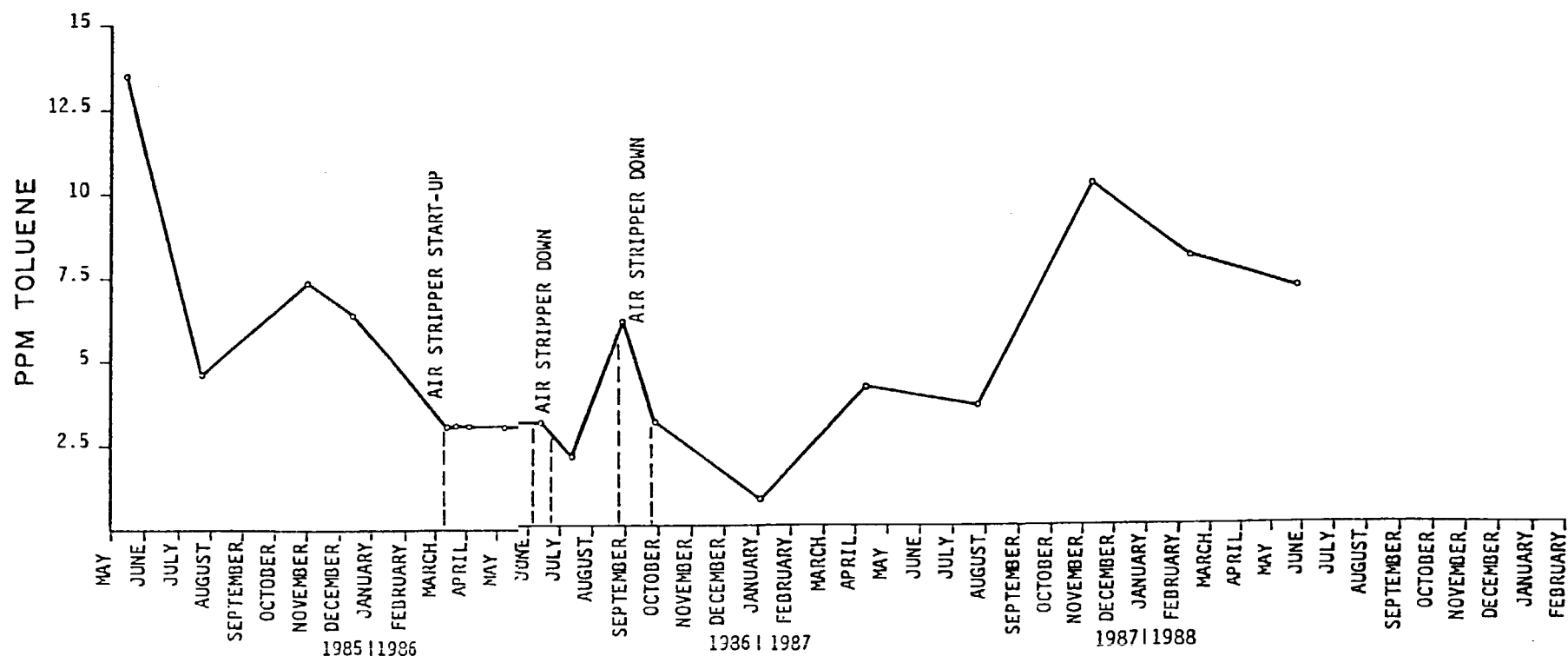
SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS

7/27/88



FEHR-GRAHAM & ASSOCIATES
ENGINEERING AND SCIENCE CONSULTANTS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643 61032-5098

MW 15



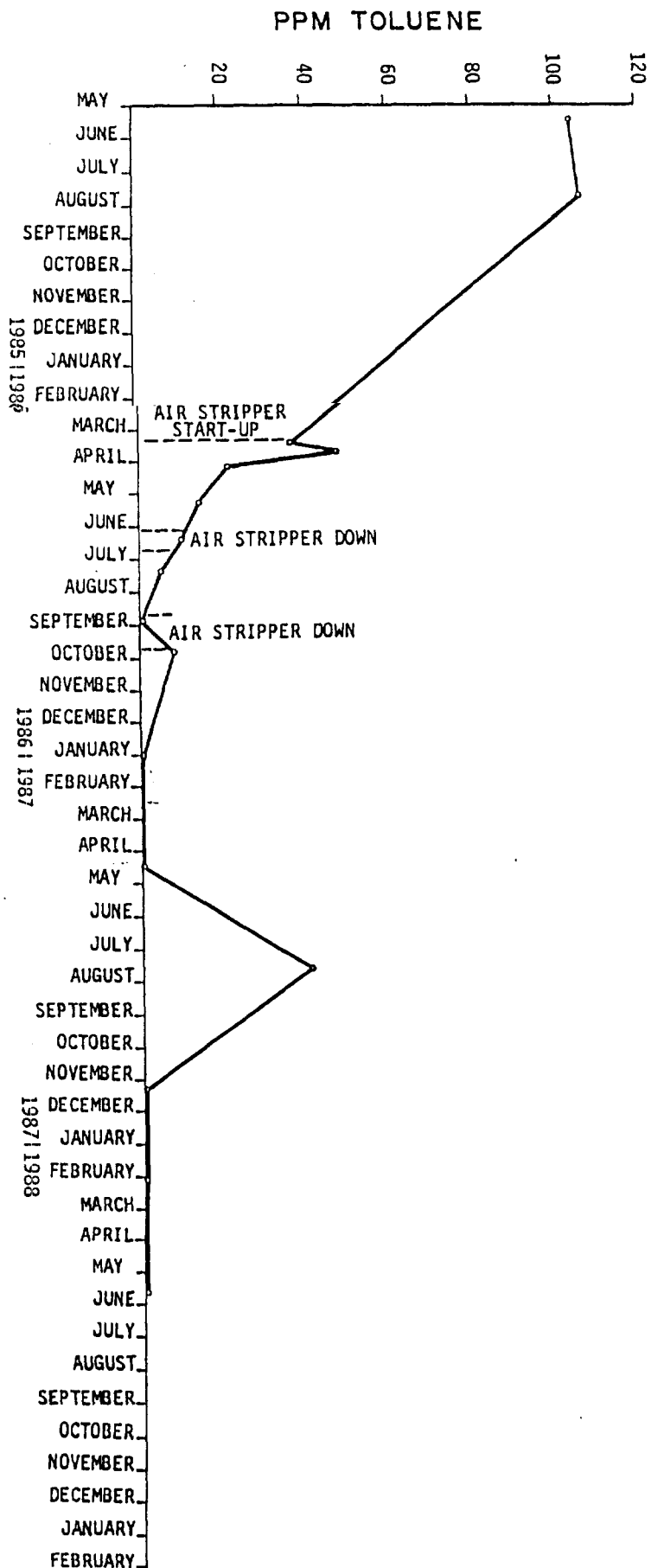
SUNDSTRAND AVIATION TOLUENE REMEDIAL ACTION RESULTS

7/27/88



FEHR-GRAHAM & ASSOCIATES
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660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643 61032-5098

SUNDSTRAND AVIATION TOLUENE REMEDIAL ACTION RESULTS



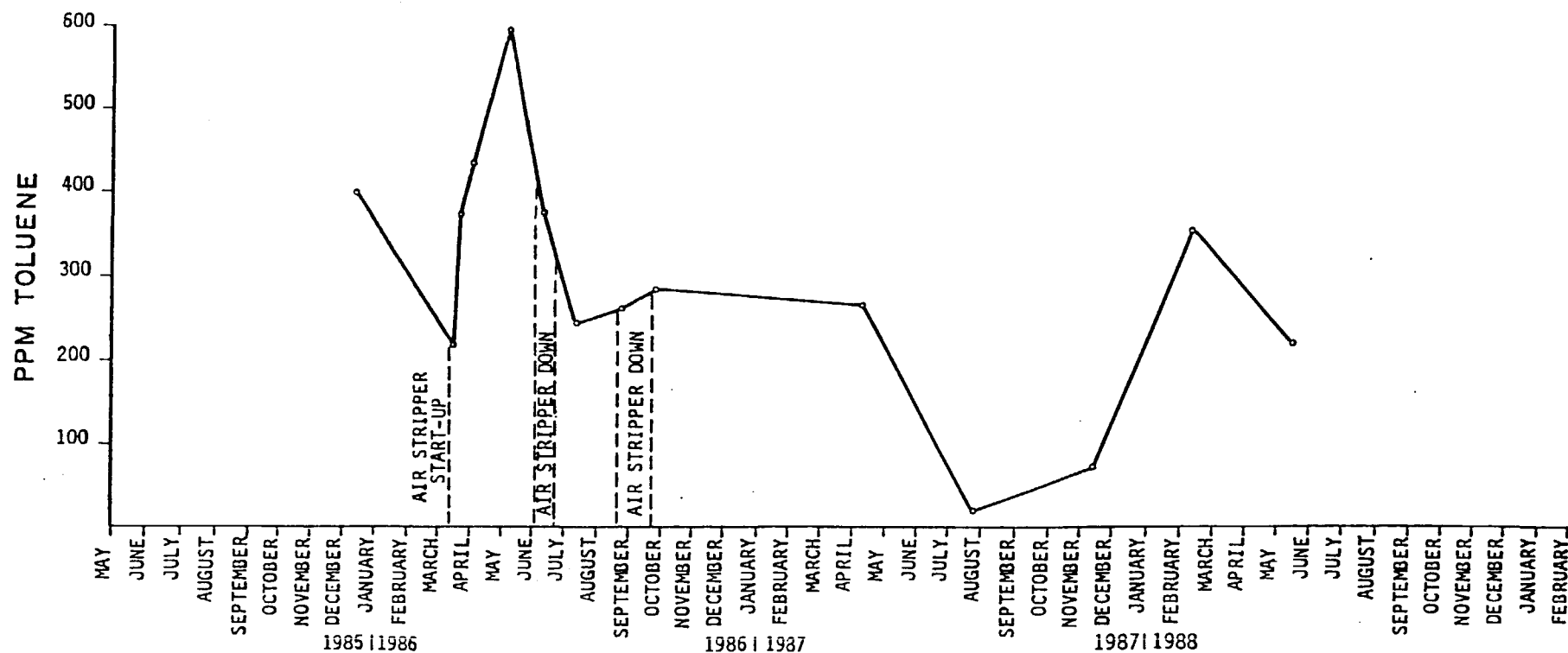
MW 5



FEHR-GRAHAM & ASSOCIATES
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660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

7/27/88

MW 4A



SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS

7/27/88



FEHR-GRAHAM & ASSOCIATES
ENGINEERING AND SCIENCE CONSULTANTS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643 61032-5098

Sundstrand Aviation Operations

unit of Sundstrand Corporation



4747 HARRISON AVENUE, P O. BOX 7002 • ROCKFORD, ILLINOIS 61125-7002 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 257-440

June 24, 1987
EPA87-033

OK

Mr. Steve Colantino
Illinois Environmental Protection Agency
Division of Land Pollution Control
2200 Churchill Road
Springfield, Illinois 62706

Reference: 2010300038 -- Winnebago County
Sundstrand Corporation - Aviation Division
Superfund/Technical Report

Dear Mr. Colantino:

Enclosed, please find a copy of the 1st annual report pertaining to the first year operation of the Toluene Remedial Action Program at our 4747 Harrison Avenue, Rockford, Illinois location.

Please review this report and should you have any questions or require additional information, please call either myself at (815) 226-6934 or Mr. Bill Coole at (815) 226-6303.

Sincerely,

A handwritten signature in cursive script that reads "Al Munn".

Al Munn
Supervisor ATG Loss Control

AM/jw
Enclosure
cc: Kerry Keller
IEPA Rockford

Allen E. Fehr
Joseph G. Graham
Erwin D. Toerber
Quentin H. Davis
Mark K. Young

660 W. Stephenson Street
Freeport, Illinois 61032
815/235-7643



FEHR-GRAHAM
& ASSOCIATES
Engineering and Science
Consultants

May 18, 1987

Mr. Al Munn
Sundstrand Corp.
P.O. Box 7002
4751 Harrison Ave.
Rockford, IL 61125

Dear Al:

This report details the effectiveness of the Toluene Remedial Action Program at Sundstrand's facility located at 4751 Harrison Avenue, Rockford, Illinois, after one full year of operation as indicated by monitor well sampling results. These results are summarized in the attached graphs and sample result sheets. The location of the monitoring wells are shown on the attached map.

The system has shown itself to be a very effective remedial activity during the first year of operation. Only two monitoring wells are currently showing levels of toluene contamination greater than drinking water standards--MW15 and MW4A.

MW4A is located adjacent to the area where the release occurred and is probably receiving toluene which is desorbing from the soil. The fact that MW4A is continuing to show high levels of contamination tends to lead to the conclusion that the flushing system, which is operating within 10 feet of MW4A, is purging the soil of contamination, and through this action is keeping the concentrations high in this well.

MW4A was not sampled in January as it had apparently been hit by a vehicle and bent. By April, the well had been repaired enough to sample with a bailer.

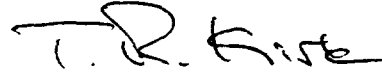
MW24 and MW5 are continuing to show decreasing levels of contamination from the time of the last report, which contained data through the first six months of the remedial action program. These wells had been strongly impacted by toluene concentrations prior to start up and have shown excellent response to cleanup activities since that time. The downgradient wells, MW26 and MW10, have shown no evidence of toluene contamination adding to our assurance that the spreading of toluene contamination has been arrested by the remedial action being taken.

May 18, 1987
Mr. Al Munn
Page 2

The calculated radii of influence of the two pumping wells are shown on the attached map. The wells are continuing to pump at a combined 25 gpm with PW1 pumping 20 gpm and PW2 pumping 5 gpm. The flushing system is currently operating at a rate of approximately 1.5 gpm.

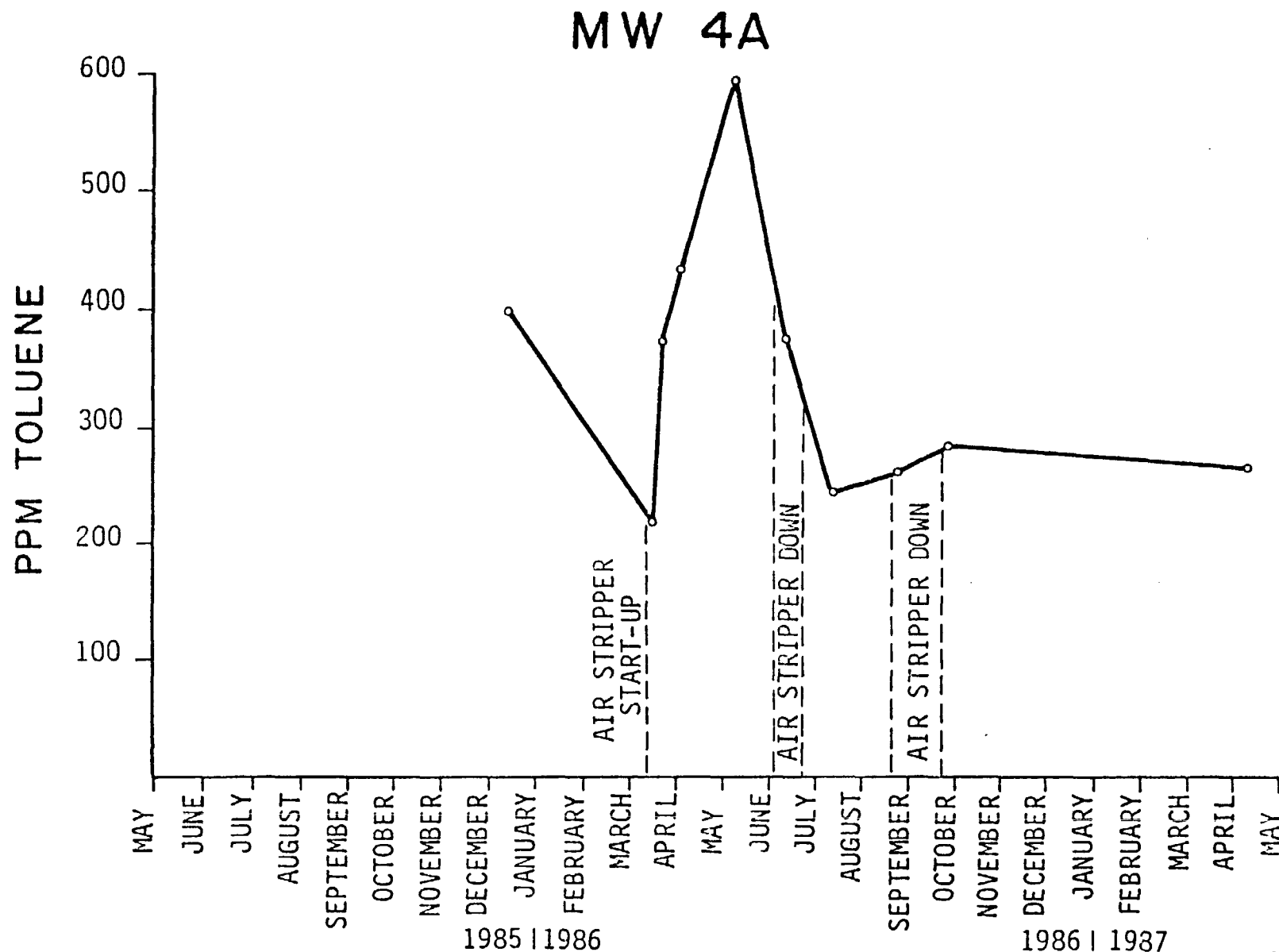
Should you have any questions regarding this matter, please feel free to contact me.

Sincerely yours,



T. R. Kirk
Geologist

TRK:ds
Enclosures



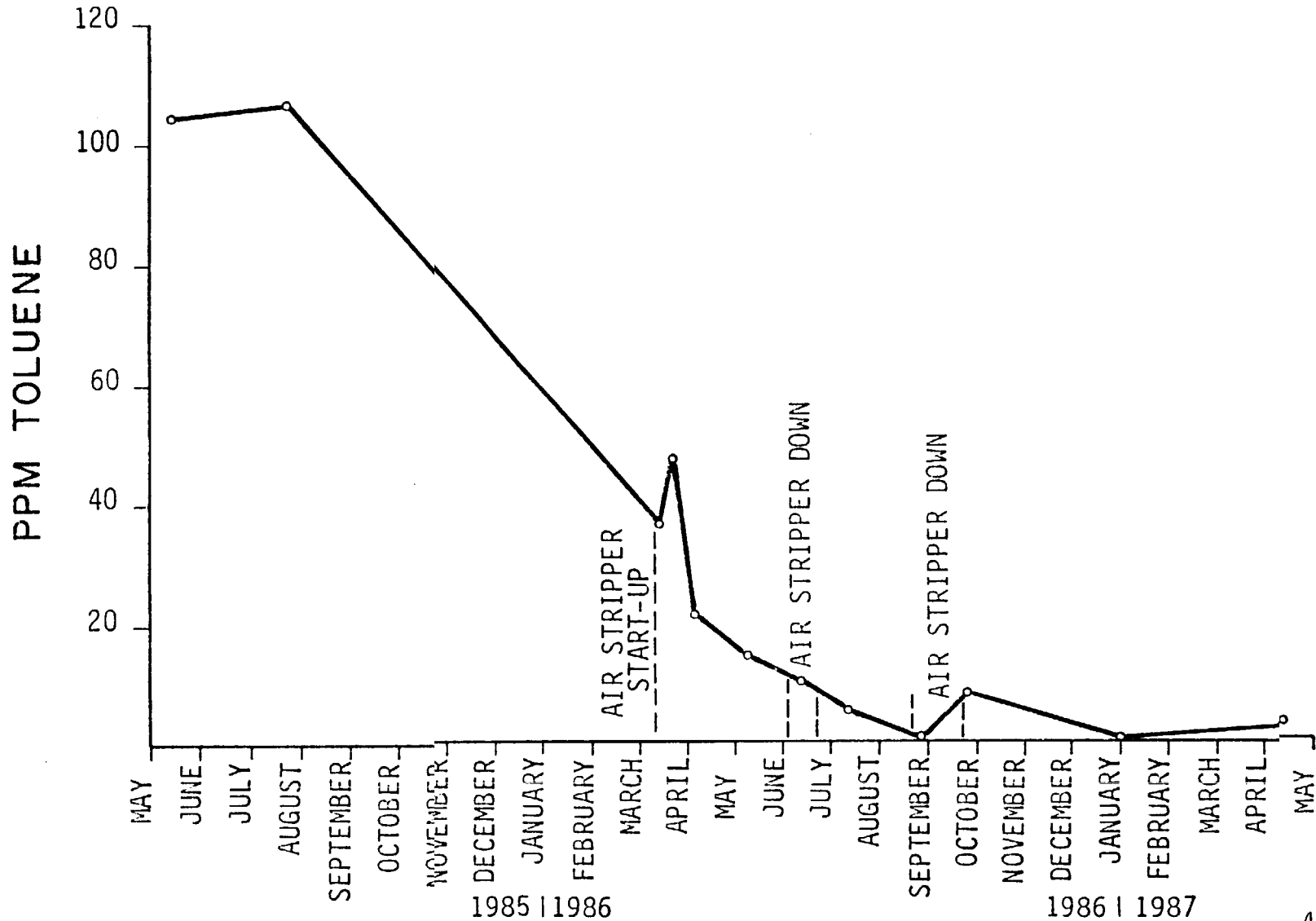
SUNDSTRAND AVIATION TOLUENE REMEDIAL ACTION RESULTS



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

4/29/87

MW 5



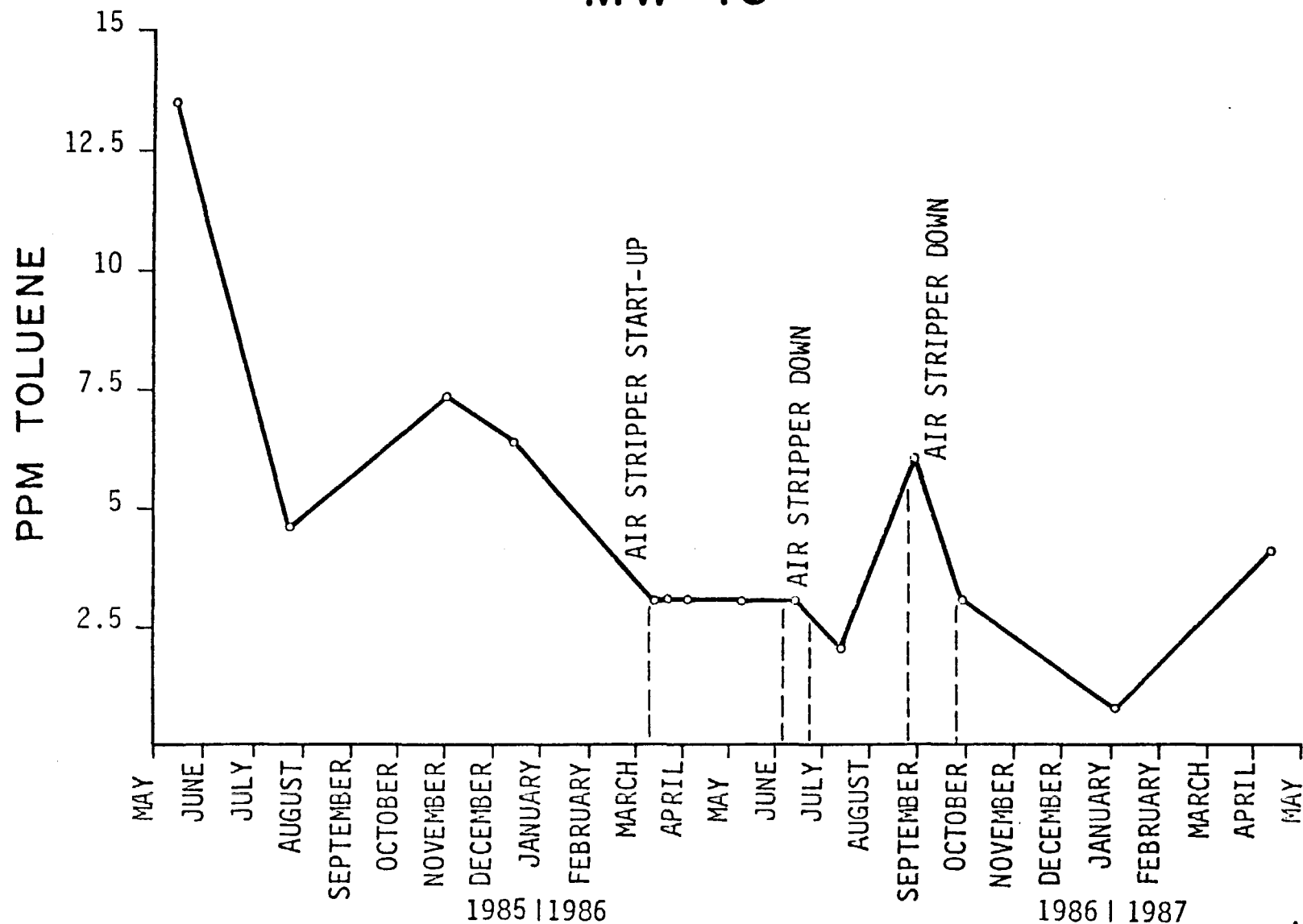
SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

4/29/87

MW 15



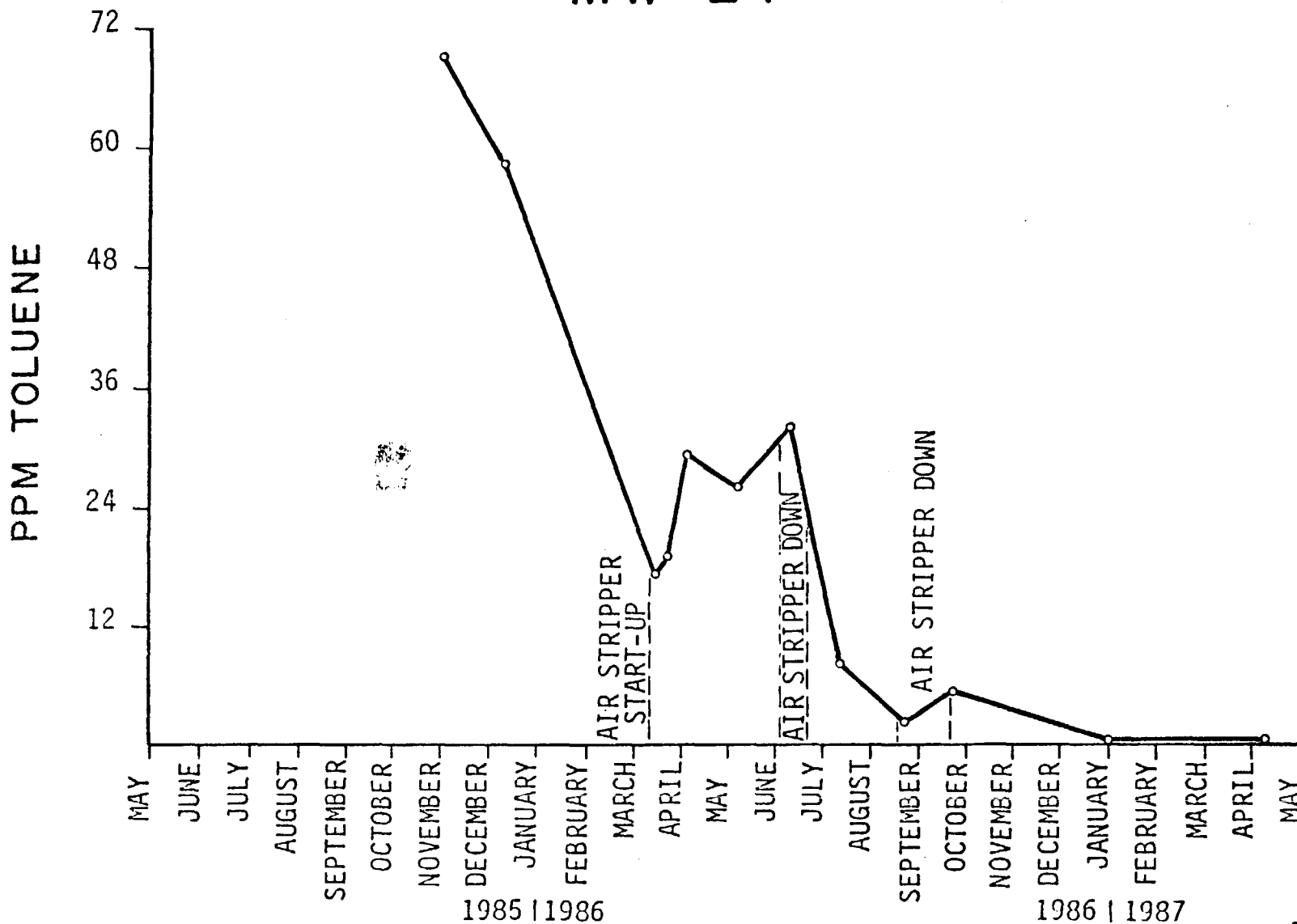
**SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS**



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

4/29/87

MW 24



4/29/87

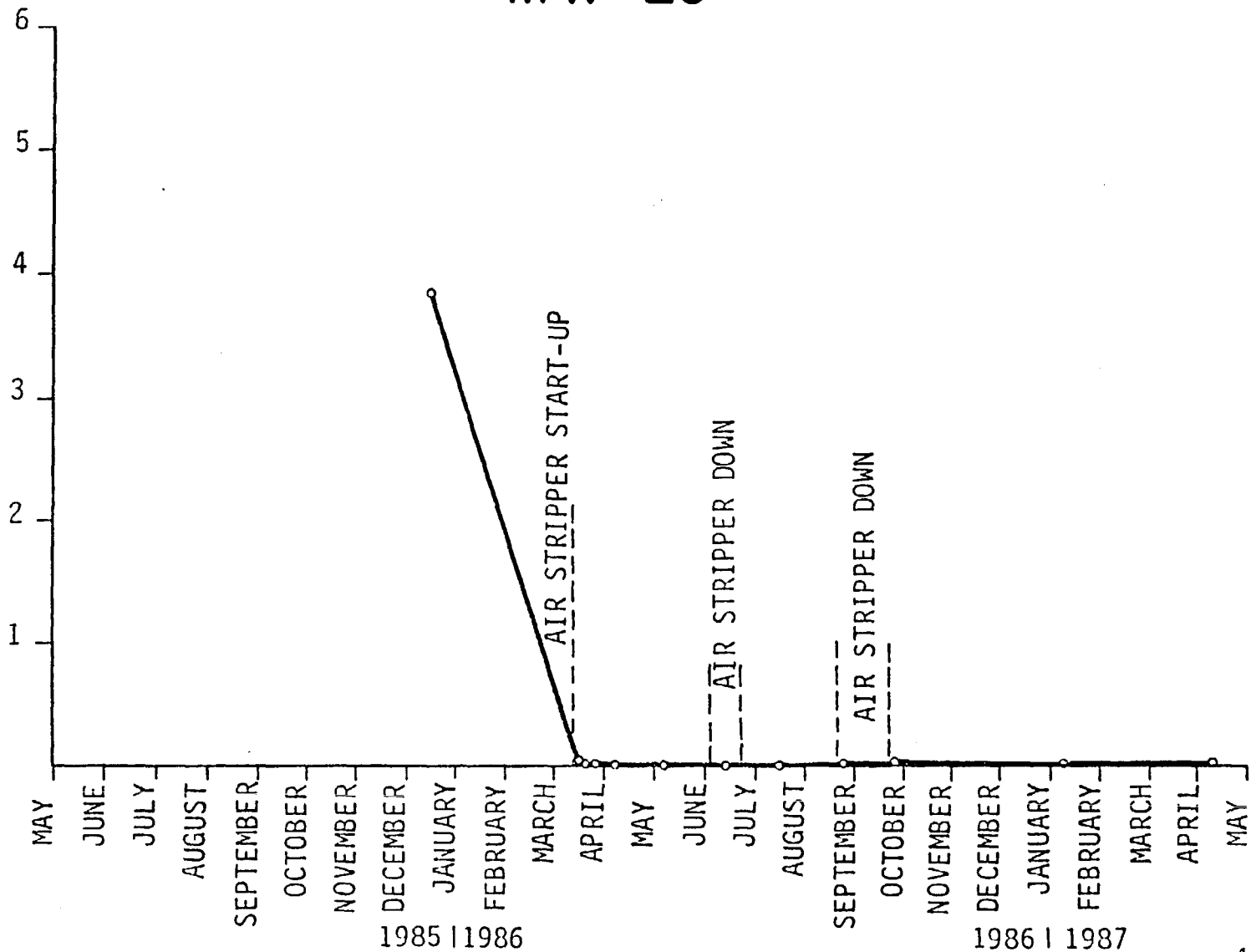
SUNDSTRAND AVIATION TOLUENE REMEDIAL ACTION RESULTS



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

MW 25

PPM TOLUENE



4/29/87

SUNDSTRAND AVIATION
TOLUENE REMEDIAL ACTION
RESULTS



FEHR, GRAHAM & ASSOCIATES
CONSULTING ENGINEERS
660 W. STEPHENSON ST., FREEPORT, ILLINOIS
815/235-7643

MONITORING WELL NO. 4A

SAMPLE RESULTS

PROJECT San Ostrando JOB NO. 26143

BOTTOM ELEVATION 8051 GEOLOGICAL FORMATION Dolomite

PARAMETER	DATE	DATE	DATE	DATE	DATE	DATE
	3/13/86	3/27/86	3/27/86	4/13/86	5/17/86	6/10/86 ***
water level	813.89	812.85	813.49	814.51	815.28	816.64
toluene	218ppm	372ppm	22ppm*	433ppm	591ppm	372ppm
temperature °F	53.5	53.0	55.1	55.2	57.8	59.2
	7/11/86	8/25/86 **	9/25/86	11/8/87 ***	bailer 4/9/87	
water level	814.26	813.76	815.77	812.01	806.60	
toluene	241ppm	260ppm	283ppm	—	272ppm	
temperature °F	—	61.9	61.2	—	—	

**** Air Strippers below**

*** Pump and water wouldn't go down well

MONITORING WELL NO. 5

SAMPLE RESULTS

PROJECT Sunilstrand JOB NO. 26143

BOTTOM ELEVATION 773.4 GEOLOGICAL FORMATION Dolomite

[illegible]

* false reading
** Air Stripped Water

MONITORING WELL NO. 15

SAMPLE RESULTS

PROJECT Sandstrand JOB NO. 26143

BOTTOM ELEVATION 793.4 GEOLOGICAL FORMATION Dolomite

	DATE	DATE	DATE	DATE	DATE	DATE
PARAMETER	3/13/86	3/24/86	3/27/86	4/3/86	5/7/86	** 6/10/86
water level	803.50	804.99	805.08	805.45	805.48	809.50
turbidity	3 ppm	3ppm	2ppm*	3ppm	3ppm	3ppm
temperature °F	53.0	52.8	53.8	55.1	58.0	58.0
	7/11/86	** 8/25/86	9/25/86	1/8/87	4/9/87	
water level	804.67	804.38	804.13	803.90	801.87	
turbidity	2ppm	6ppm	3ppm	4.6ppm	4.2ppm	
temperature °F	59.3	58.0	64.5	49.5	—	
* false reading						

* False reading
** Air stripper down

MONITORING WELL NO. 24

SAMPLE RESULTS

PROJECT Sandstrand JOB NO. 26143

BOTTOM ELEVATION 768.6 GEOLOGICAL FORMATION Dolomite

[illegible]

* False Bonding
** Air Strippers Down

MONITORING WELL NO. 25

SAMPLE RESULTS

PROJECT Sandstrand JOB NO. 26143

BOTTOM ELEVATION 706.3 GEOLOGICAL FORMATION Dolomite

	DATE	DATE	DATE	DATE	DATE	DATE
PARAMETER	3/13/86	3/20/86	3/27/86	4/3/86	5/7/86	** 6/10/86
water level	805.46	804.45	804.50	805.75	804.60	807.32
toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb
temperature °F	52.3	51.0	51.2	52.8	53.0	54.5
		**				
	7/11/86	8/25/86	9/25/86	1/8/87	4/7/87	
water level	803.43	803.07	802.44	802.48	802.09	
Toluene	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	
temperature °F	54.1	53.9	54.8	50.9°	53.0	
** Air stirrer down						

MONITORING WELL NO. 26

SAMPLE RESULTS

PROJECT Semi Island JOB NO. 26143

BOTTOM ELEVATION 749.1 GEOLOGICAL FORMATION Dolomite

	DATE	DATE	DATE	DATE	DATE	DATE
PARAMETER	3/13/86	3/20/86	3/27/86	4/3/86	5/7/86	** 6/10/86
Water level	806.07	804.95	805.06	805.32	804.94	806.94
Turbidity	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb
Temperature °F	52.1	51.8	51.9	52.8	53.2	54.7
	7/11/86	** 8/25/86	9/25/86	1/8/87	4/9/87	
Water level	804.20	804.60	803.11	803.34	801.09	
Turbidity	<5ppb	<5ppb	<5ppb	<5ppb	<5ppb	
Temperature °F	54.8	53.6	55.8°	48.2°	53.1	
** Air speeder down						

Two documents by Harding Lawson Associates are on file with the IEPA with respect to Plant 6 in Rockford, IL:

February 26, 1991

Plant 6 Facility Tank Farm
Area Investigation; and

March 4, 1991

Soil Pile Closure Plan.



April 11, 1985

Mr. George Madany
United States Environmental
Protection Agency
230 S. Dearborn
Chicago, Illinois 60604

Dear Mr. Madany:

Following Sundstrand's report on March 10, 1985 to the National Response Center regarding the probable continuous leaking of hazardous materials into the environment, you contacted me and requested that I provide to you a report relating to the release. Unless advised by you to the contrary, I will assume that the information contained in this letter meets all of your requirements.

As I advised you in our telephone conversation, Sundstrand reported on December 7, 1984 to the National Response Center the release of toluene into the environment from our facility located at 4747 Harrison Avenue, Rockford, Illinois 61125. In connection with our efforts to determine the location of the released toluene and the movement of ground water at this location we employed a consultant which, among other things, installed twelve monitoring wells. As the result of samples taken from certain of the wells we learned that other contaminants were present in the ground water.

Based upon the information provided by the consultant, we then commenced efforts to determine whether the source of the other contaminants was from our plant site or from a source located elsewhere. Through the installation of additional monitoring wells we were able to determine that the source of the contaminants was probably from our facility. Thereafter we commenced efforts to determine the specific sources of the release into the environment. As a result of this effort, we were able to pin point three potential sources from which it was probable releases had continuously occurred over a significant period of time. These sources can be described as follows:

1. Three tanks located within the plant used for the accumulation and temporary storage of hazardous wastes;
2. A tank farm and hazardous waste containment pump located on the east side of the plant; and

3. Concrete trenches located in a test area within the plant.

After determination of these potential sources we advised the National Response Center on March 20, 1985 and efforts were immediately made as appropriate to either restrict or totally eliminate their usage. In addition, instructions were given to evaluate possible alternatives relating to correction of the potential sources and to address the contaminants in the soil. Further, our consultant was authorized to help determine whether a plume exists, the location of the plume if it exists, and the development of a remedial action plan.

Presently, we are moving forward with remedial action regarding the toluene release and anticipate the installation of necessary equipment and start up by June of this year. This remedial plan is being developed with our consultants and we are coordinating our efforts with the Illinois Environmental Protection Agency to insure their acceptance of the plan and the issuance of such discharge permits as will be necessary.

Regarding the release of the toluene, tetrachloroethylene, trichloroethylene, 1,1 dichloroethylene and 1,1,1 trichloroethane which was reported to the National Response Center on March 20, 1985, you should be advised that we are still engaged in investigatory work. Internally, we are developing a remedial action plan relating to the correction of the potential sources which we have isolated including action to address contaminated soil. We have further authorized our consultant to install the additional monitoring wells which it has advised to be necessary to determine the location of the plume of contaminated ground water, assuming a plume exists.

Although we have not as yet established a firm timetable for this action, I can indicate that the development of our internal remedial action plan is proceeding and the first report is presently under review. With respect to the installation of monitoring wells, the consultant has already commenced the drilling of same. It is our intent to diligently move forward with our efforts and we will be coordinating with the Illinois Environmental Protection Agency to insure that the remedial action plan which we develop is acceptable to it.

Very truly yours,

SUNDSTRAND CORPORATION

William R. Coole
Assistant General Counsel

WRC:jmf

Sundstrand Corporation



CORPORATE OFFICES • 4751 HARRISON AVENUE, P O BOX 7003 • ROCKFORD, ILLINOIS 61125-7003 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 257-440

March 20,- 1985

Mr. Charles Corley
Illinois Environmental Protection Agency
4302 N. Main Street
Rockford, IL 61103

Dear Mr. Corley:

With respect to our telephone conversation of today, please find enclosed information relating to the toluene spill which occurred at our Rockford, Illinois, facility in 1984. This information is as follows:

1. A compressed site plan showing the location of monitoring wells which have been installed;
2. A summary of the well installations indicating what a typical well looks like and indicating the depth from the ground surface of each well; and
3. A summary of the contaminant concentrations shown in each of the wells. You should note that with respect to monitoring well 8, no sample was taken since this well was initially installed to help determine the direction of ground water flow.

If you have any questions concerning this information, please feel free to contact me.

Very truly yours,

SUNDSTRAND CORPORATION

William R. Coole
Assistant General Counsel

WRC:jmf

CC: John Perry (IEPA)
Mark Chiado
Alan Fehr
Bernard Kittle
Joe McCarthy
Al Munn ✓
Curt Rosser
Allan Sedmak

Sundstrand Corporation



CORPORATE OFFICES • 4751 HARRISON AVENUE, P.O. BOX 7003 • ROCKFORD, ILLINOIS 61125-7003 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 257-440

March 20, 1985

Mr. John Perry
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62706

Dear Mr. Perry:

With respect to our telephone conversation of today, please find enclosed information relating to the toluene spill which occurred at our Rockford, Illinois, facility in 1984. This information is as follows:

1. A compressed site plan showing the location of monitoring wells which have been installed;
2. A summary of the well installations indicating what a typical well looks like and indicating the depth from the ground surface of each well; and
3. A summary of the contaminant concentrations shown in each of the wells. You should note that with respect to monitoring well 8, no sample was taken since this well was initially installed to help determine the direction of ground water flow.

If you have any questions concerning this information, please feel free to contact me.

Very truly yours,

SUNDSTRAND CORPORATION

William R. Coole
Assistant General Counsel

WRC:jmf

CC: Charles Corley (IEPA)
Mark Chiado
Alan Fehr
Bernard Kittle
Joe McCarthy
Al Munn ✓
Curt Rosser
Allan Sedmak



PREPARED BY REQUEST
OF SUNDSTRAND ENVIRONMENTAL COMMITTEE

PLANT SIX WATER AND SOIL
CONTAMINATION INVESTIGATION

SOURCE ELIMINATION PROPOSAL

SUBMITTED TO
SUNDSTRAND ATG ENVIRONMENTAL COMMITTEE

AUGUST 27, 1985

Prepared by: Alistair Munn
Environmental Analyst
Sundstrand ATG (Rockford)

C. Richard Peifer
Facility Engineer
Sundstrand ATG (Rockford)

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INTRODUCTION

The following proposal is submitted to the Sundstrand ATG Environmental Committee for your review and approval so a complete and permanent elimination of four (4) identified soil and/or water contamination sources at Plant Six can begin.

The sources contained in this proposal will be identified as follows:

Source #1 - Inside tank farm. This source consists of three (3) inside underground tanks and the connecting trench and piping system throughout main assembly, and underground piping from tanks to outside underground tank farm. (See diagram #1)

Source #2 - Outside tank farm. This source includes all underground storage tanks, including virgin materials. It also includes the central collection sump for the two (2) waste oil tanks. (See diagram #2)

Source #3 - Inside PTA trench area and associated drains and piping.
(See diagram #3)

Source #4 - ORC spill containment tank and trenches. (See diagram #4)

PLEASE NOTE: This proposal and associated costs are estimates based on the items recommended for permanent source elimination. It is believed this proposal will greatly reduce or even eliminate current and future environmental exposure from these areas. Upon committee approval, a Plant Engineering Service Request will be submitted to Plant Engineering to execute the provisions of this proposal. At that time, final engineering and specifications will be developed and quotes from contractors received for all sources to facilitate this project.

Total estimated cost for completing this project is as listed:

Source #1 --	80,600.
Source #2 --	143,800.
Source #3 --	29,500.
Source #4 --	5,000.
	<u>\$258,900.</u>

No contingency cost is included in this estimate at this time. f

SOURCE #1

A. Three (3) 1,000 gallon underground waste tanks.

1. 1,1,1 Trichloroethane
2. Waste Oil
3. Stoddard Solvent

B. Associated piping and trenches to and from these tanks. Approximate length of piping to the tank is 2,700 feet. Trenches containing the piping is approximately 1,030 feet. Piping from these tanks to the outside tank farm is approximately 1,500 feet.

C. Four (4) dump stations consisting of three (3) drains each.

PROPOSED CLEANUP AND SOURCE ELIMINATION:

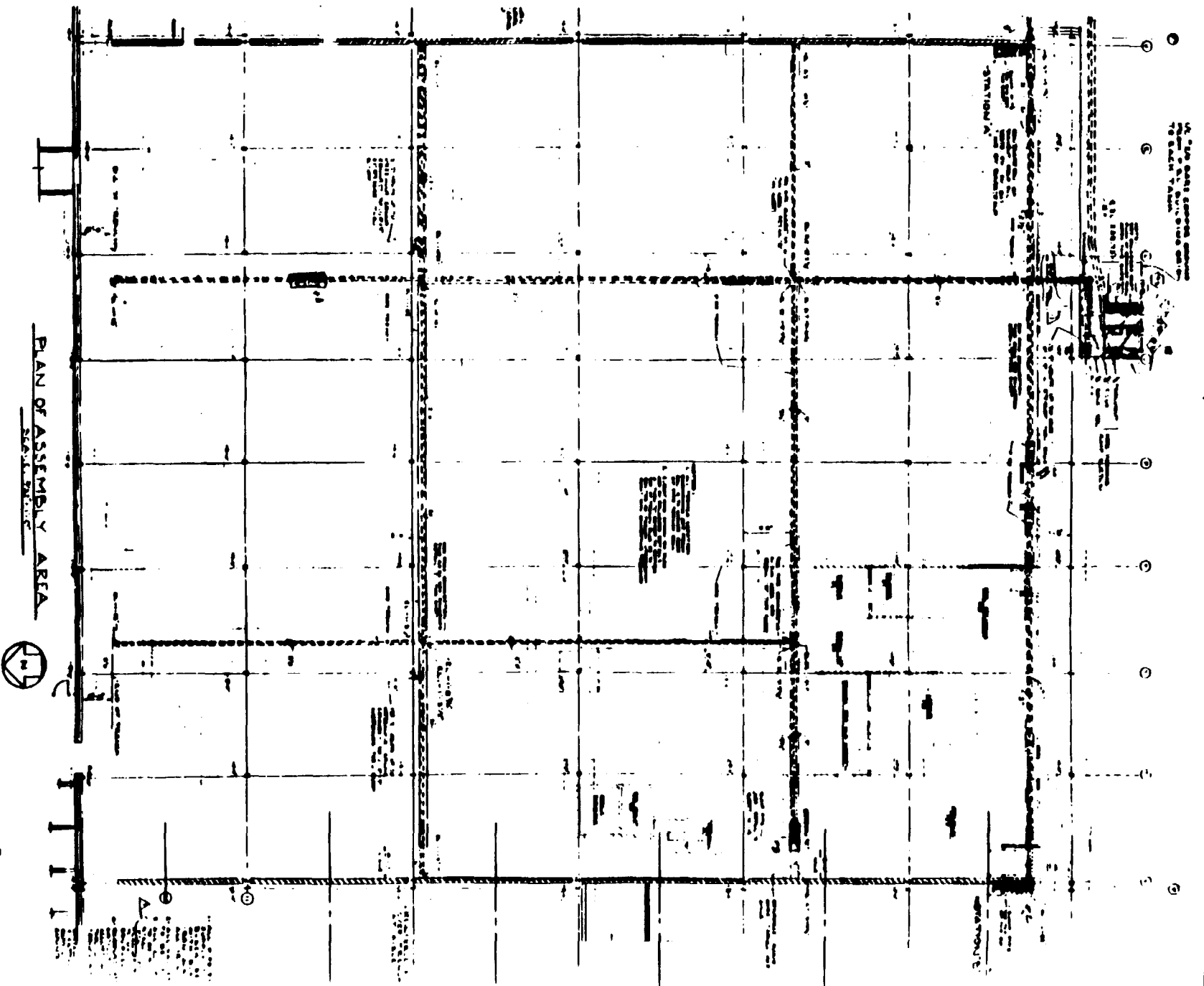
- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| A. 1) Remove all three underground tanks. Steam clean and dispose. | \$19,500. |
| 2) Sample soil area for contamination to determine extent for soil removal. | 3,000. |
| 3) Remove approximately 120 yards of soil. | 2,000. |
| Dispose in a licensed landfill. | 6,500. |
| 4) Back fill and replace flooring. | 5,000. |
| B. 1) Steam clean, remove and dispose all aboveground piping. (Trenches) | 9,000. |
| 2) Flush and clean all underground piping (1500 ft.) and cap <u>or</u> remove all underground piping, steam clean and dispose, which is preferred. | \$31,800. |
| (Steam cleaning of pipes is estimated at \$1,800 and may not be possible while pipes are in place.) | |
| 3) Steam clean all trenches and abandon | 2,000. |

\$

C. 1) Steam clear and fill dump stations with concrete 800.

Total estimated cost
for Source #1 \$80,600.

Cost to clean tanks and fill with concrete in
place is \$4,000.



NO. 1000 VOLUME 1	DRY DOCK AND SHIP LOWER LEVEL, CENTER	22048	LARGE AND SMALL AIA	ARCHITECT
----------------------	------------------------------------------	-------	---------------------	-----------

SOURCE #2

While only two (2) of the existing fourteen (14) underground tanks are strongly suspected of leaking, we have addressed the entire tank farm in this proposal. It is felt we should address the entire area to eliminate potential exposure than apply a band aid type of solution.

A. Fourteen (14) underground tanks.

- ④ 4,000 gal. Reclaim 1,1,1 Trichloroethane
- ⑤ 4,000 gal. Dirty 1,1,1 Trichloroethane
- ⑥ 10,000 gal. New 1,1,1 Trichloroethane
- ⑦ 10,000 gal. Waste Oil
- ⑧ 10,000 gal. New Stoddard Solvent
- ⑨ 10,000 gal. Waste Oil
- ⑩ 4,000 gal. Reclaim Stoddard Solvent
- ⑪ 4,000 gal. Dirty Stoddard Solvent
- ⑫ 4,000 gal. Perchloroethylene
- ⑬ 4,000 gal. Daubert X201 Oil
- ⑭ 2,000 gal. DTE 25 Oil
- ⑮ 2,000 gal. Chemtool 1318 Oil
- ⑯ 2,000 gal. Vacmul 3A Oil
- ⑰ 2,000 gal. Empty

B. Associated piping both to and/or from the tanks.


C. Central collection sump for distribution to waste oil tanks.

D. One (1) 500 gallon diesel fuel storage tank located underground.

PROPOSED CLEANUP AND SOURCE ELIMINATION:

- A. 1) Relocation of Propane Storage Tank currently located over existing tank farm. \$2,500.
- 2) Remove two (2) 4,000 gallon tanks (#14 & #5), back fill and resurface to match existing 8,000.
- 3) Remove two (2) 4,000 gallon tanks (#10 & #11). backfill and resurface 8,000.
- 4) Remove two (2) 4,000 gallon tanks (#12 & #13). back fill and resurface. 8,000.

- 5) Remove four (4) 2,000 gallon tanks (#14, 15, 16 & 17), back fill and resurface. \$15,000.
- 6) Remove four (4) 10,000 gallon tanks (#6, 7, 8 & 9), back fill and resurface. 28,000.
- 7) Remove and install new tank #8. 5,000.
- 8) Tanks #4, 5, 10 and 11 will be eliminated. Combine tanks #12 and 13 (4k each) into one 8,000 gallon compartmentized tank. Combine tanks #14, 15, 16 & 17 (2k each) into one 8,000 gallon compartmentized tank. Combine tanks #7 & 8 (10k each) into one 15,000 gallon tank. Tank #6 will be relocated above ground. Tank #8 will be replaced with an underground double wall tank with leak detection system between walls.
- 9) Above ground tanks will consist of two (2) 8,000 gal., (1) 10,000 gallons and one (1) 15,000 gallons.



(2)	8,000 gallons - 8'-0" x 22'-0"	12,000.
(1)	10,000 gallons - 9'-0" x 21'-0"	7,500.
(1)	15,000 gallons - 10'-6" x 24'-0"	11,500.
- 10) The below ground tank (#8) which is of double wall construction is 10,000 gallons. 12,000.
- 11) A concrete containment area to be 56' x 30' x 3' in dimension. 12,000.
- B. Piping from new tanks to pump house. 3,500.
- C. 1) Remove existing central collection sump and replace with two (2) new ones constructed to prevent leaks. (Diagram 2c) 3,500.
- 2) Sample soil around sump for contamination and disposal of approximately 50 cubic yards in licensed landfill. 3,800.
- D. 1) Remove one (1) 500 gallon diesel fuel tank. 1,500.
- 2) Back fill and install containment area and resurface. Install one (1) new above ground 500 gallon diesel fuel storage tank. 2,000.

Total estimated cost for Source #2 \$143,800.

Should these tanks be placed above ground, heaters will have to be used.

Diagram #2

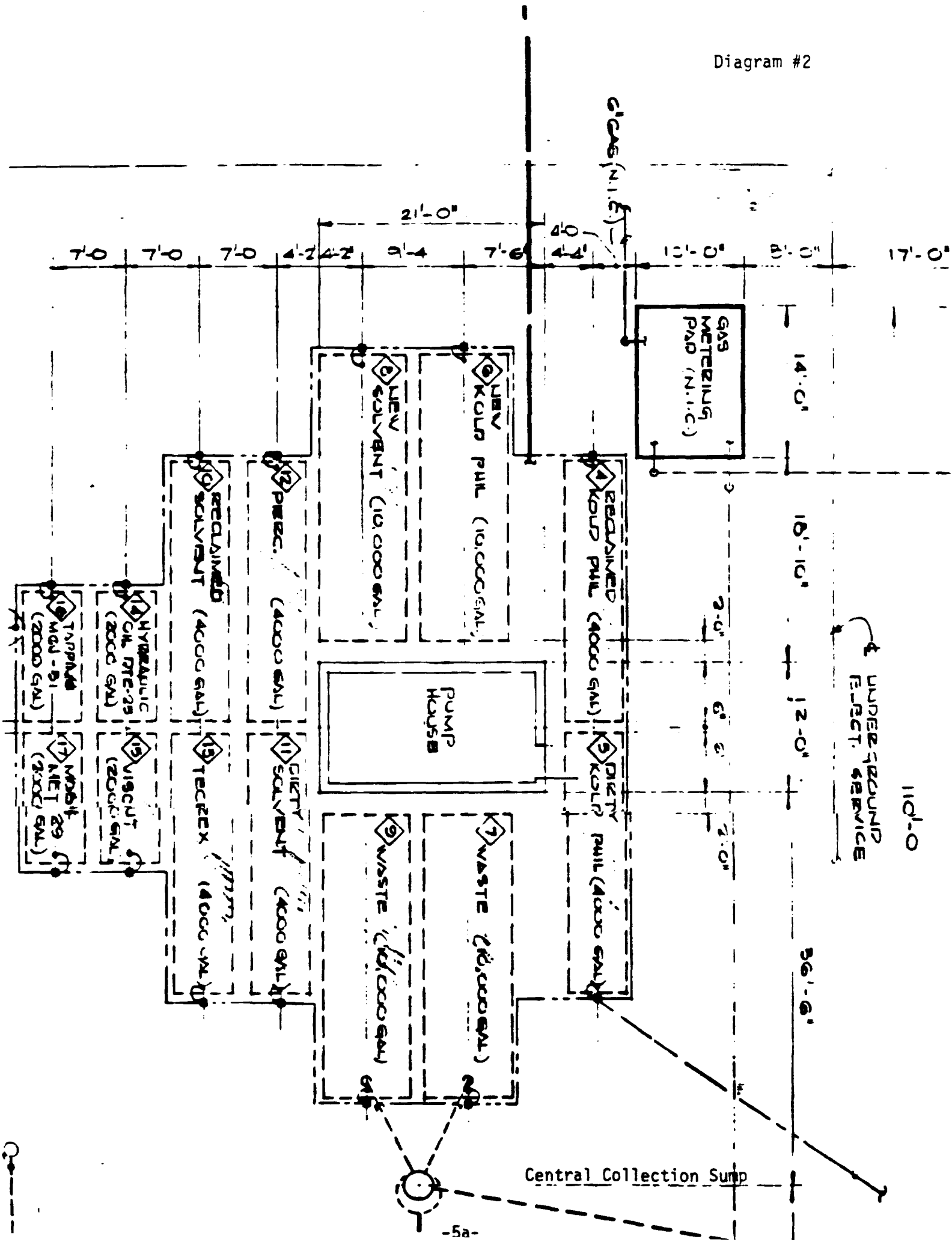


Diagram 2a

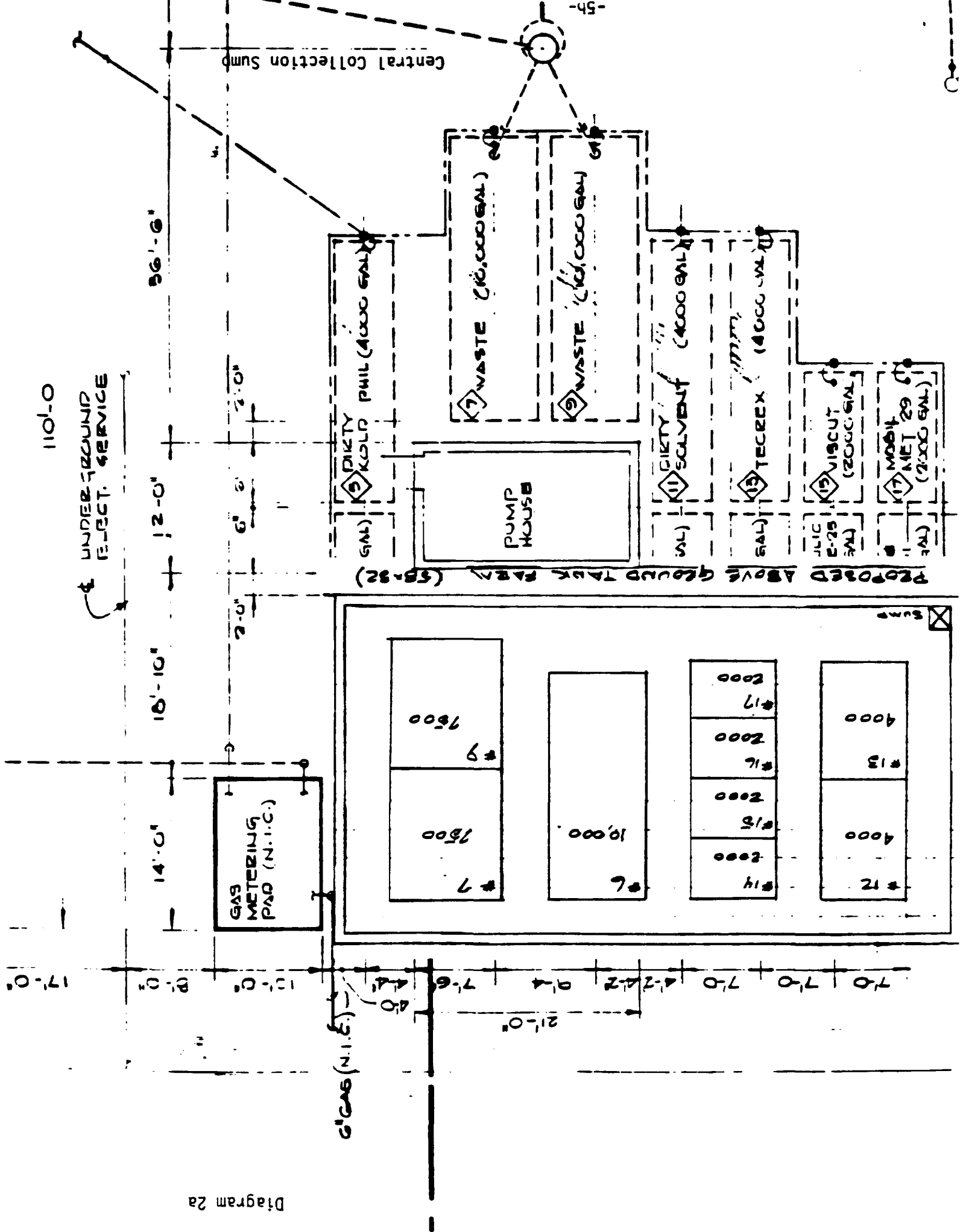
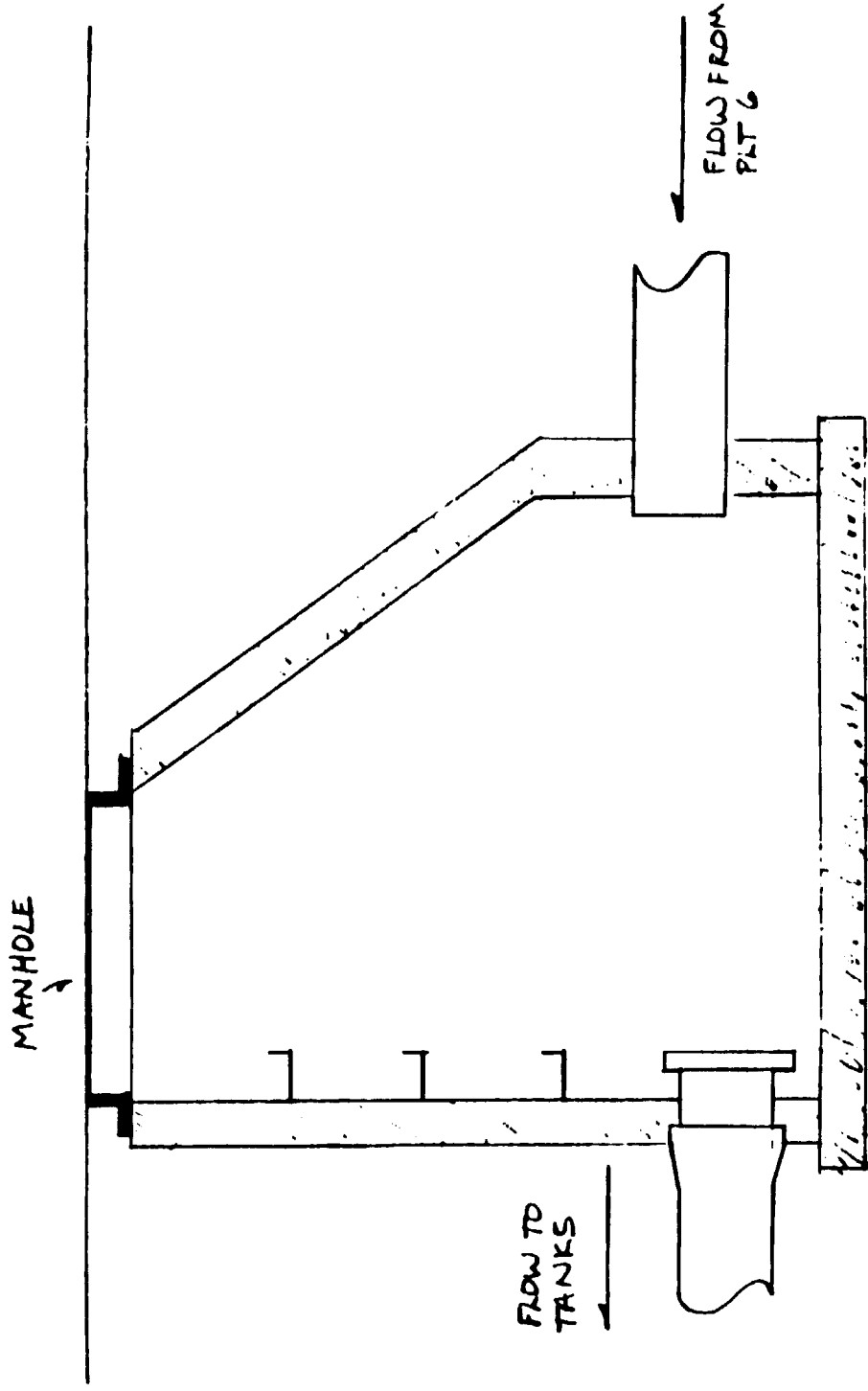


Diagram 2c

CENTRAL COLLECTION SUMP



NO SCALE
3-21-85

SOURCE #3

- A. This source consists of six (6) connected trenches used for collection of spills and wash downs and is located in PTA test area of Plant Six. Approximate square footage of these trenches equals 26,920. Open steel grates cover these trenches. They flow into one common drain which leads out to the tank farm.

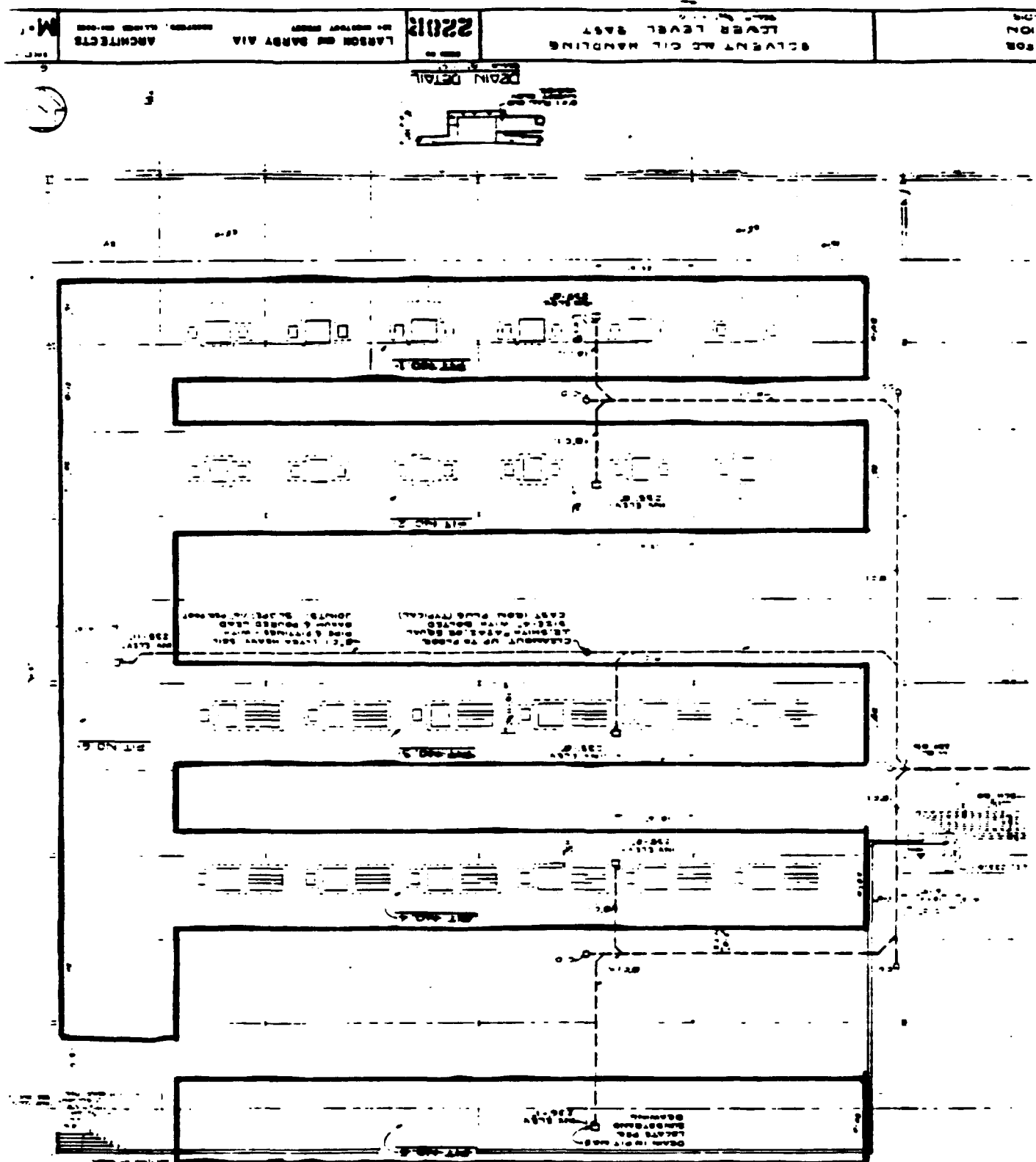
PROPOSED CLEAN UP AND SOURCE ELIMINATION:

- | | |
|------------------------------------------------------------------------------------------------|----------|
| A. 1) Steam clean all trenches and drains. | \$4,500. |
| 2) Coat trenches with an impervious material (i.e. Epoxy) | 25,000. |
| 3) Alter the solvent handling procedures used in the area to minimize spillage or splash over. | |

Total estimated cost for Source #3	\$29,500.
------------------------------------	-----------

The sump and drain replacement is addressed in Source #2.

Diagram #3



SOURCE #4

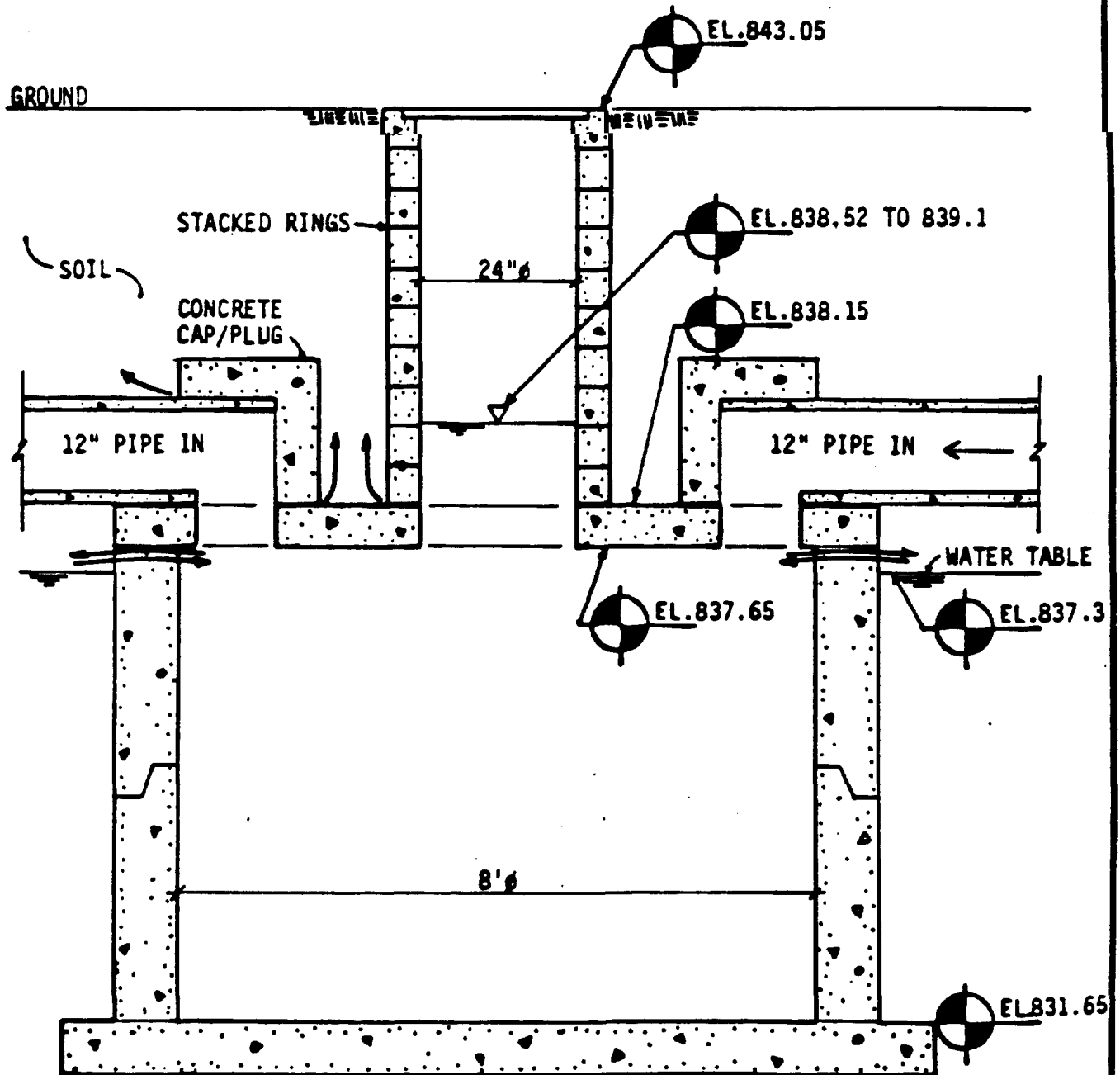
Completed

This source addresses the ORC spill containment tank and related trench system located at Cell 65, Plant Six.

- A. 1) Removal and disposal of soil immediately surrounding the tank. Approximately 75 cubic yards. \$5,000.

Total estimated cost for Source #4 \$5,000.

SPILL CONTAINMENT SUMP



JAN. 7, 1985

SCALE: 1/2" = 1'-0"



FEHR, GRAHAM & ASSOCIATES
 CONSULTING ENGINEERS
 660 W. STEPHENSON ST., FREEPORT, ILLINOIS
 815/235-7643

COMPLETION TIME

Upon approval of the Environmental Committee, an estimated time frame for completion of the entire project is nine (9) to twelve (12) months. This time frame includes all four (4) sources.

CONCLUSION

This estimate for source elimination is presented to the Environmental Committee for review. Upon your approval, the facts and figures of this proposal will be included in a Plant Engineering Service Request to Plant Engineering and work will begin.

6/20/86

LABORATORY REPORT

Exhibit B(e) 2

CBC-AquaSearch

SUNDSTRAND, AVIATION OPERATIONS
4747 HARRISON AVE POBOX 7002
ROCKFORD, IL 61125
ATTN: AL MUNN

ENVIRONMENTAL SERVICES:
Analytical, Field & Consulting
Air
Water & Wastewater
Solid & Hazardous Waste
Industrial Hygiene

S403 8408224 PDH
PZ/*A/FND / /

SAMPLE 86163-S12492 CONTAMINATED SOIL-SOLVENT SPILL
DATE COLLECTED 6/12/86 DATE RECEIVED 6/12/86

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
BTU'S	<5.0	BTU'S/LB			
% SULFUR	0.04	%			
% CHLORINE	<0.02	%			
% MOISTURE	0.63	%			
TOTAL DISSOLVED SOLIDS	N/T	PPM			
TOTAL SUSPENDED SOLIDS	N/T	PPM			
ASH CONTENT	93	%			
BARIUM - TOTAL	20	PPM			
CADMIUM - TOTAL	1.0	PPM	0.023	MG/L	1.0
CHROMIUM - TOTAL	3.1	PPM			
COPPER - TOTAL	6.8	PPM			
LEAD - TOTAL	16	PPM	<0.1	MG/L	5.0
NICKEL - TOTAL	12	PPM			
SILVER - TOTAL	0.90	PPM			
ZINC - TOTAL	31	PPM			
ARSENIC - TOTAL	0.024	PPM			
SELENIUM - TOTAL	0.067	PPM			
MERCURY - TOTAL	0.008	PPM			
COLOR	BROWN				
LAYERS	NONE				
ODOR	SOLVENT				
PHYSICAL CHARACTERISTICS	SOLID				
FREE LIQUIDS	0.0%	%			
FLASH POINT (FAHRENHEIT)	>210	DEG. F			140.0
PH (UNITS)	7.8				2.0-12.5
SPECIFIC GRAVITY	2.00	G/ML			
TOTAL SOLIDS	97	%			
PHENOL	2.5	PPM			

STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER,
15TH EDITION, 1980.

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.

TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.

ANNUAL BOOKS OF ASTM STANDARDS, 1982.

IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT AT (414) 764 - 7005
OR CALL TOLL FREE; 1-800-592-5900, WAIT FOR DIAL TONE AND DIAL EXTENSION 332.

ANY REMAINING WASTE SAMPLES WILL BE RETURNED TO THE ADDRESS LISTED ABOVE 8 WEEKS FROM THE
RECEIVING DATE OF THIS REPORT.

N/T = NOT TESTED

N/A = NOT APPLICABLE

APPROVAL

DIVISION OF CHEM-BIO CORPORATION

140 EAST RYAN ROAD OAK CREEK, WISCONSIN 53154-4599 (414) 764-7005

11. Tank #34: 4,200 gallon capacity stainless steel tank.
Product: Originally Otto fuel, most recently JP4.
Location: Plant 8.
Tank installed: 1969.

Test date: 4/20/89.

Tank #34 was topped off with JP4 on 4/20/89, and again by JND on 4/20/89. There was what appeared to be a leak in the system, too much to even test the tank. It turned out to be a valve in the pump house that was slightly open. Al's crew closed the valve, and JND retopped the tank, for an afternoon test.

Tank #34 is all stainless steel, with supports at either end of the tank. Its piping comes out of the bottom of the tank, and runs down to Plant 8 (approx 200 feet). Inside plant 8 the piping is filtered then splits off to the various test cells in Plant 8.

JND performed a two level test on this system. JND test results indicate a failure, with a leak rate of .517 gallons per hour at 65", and .48 gallons pr hour at 57".

12. Tank #35: 4,200 gallon capacity stainless steel tank.
Product: Originally Otto fuel, most recently JP4.
Location: Plant 8.
Tank installed: 1969.

Test date: 5/5/89.

Tank #35 was topped off by JND on 5/5/89. This tank showed the same problem as Tank #34. R. Peifer went down in the pump house and closed off the valve. JND topped off the tank.

Tank #35 is in the same excavation as Tank #34, located about 200 feet from Plant 8. It has the same piping run as Tank #34.

JND ran a low level test that would not come in for two reasons;

1. The tank was not topped off until 10:00 am.
2. There were extremely high winds causing the load cell to sway.

6/20/86

LABORATORY REPORT

PAGE 2

CBC-AquaSearch

ENVIRONMENTAL SERVICES:

Analytical, Field & Consulting

Air

Water & Wastewater

Solid & Hazardous Waste

Industrial Hygiene

S403 8408224 PDH

PZ/*A/FND / /

SUNDSTRAND, AVIATION OPERATIONS
4747 HARRISON AVE POBOX 7002
ROCKFORD , IL 61125
ATTN: AL MUNN

SAMPLE 86163-S12492 CONTAMINATED SOIL-SOLVENT SPILL
DATE COLLECTED 6/12/86 DATE RECEIVED 6/12/86

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
DISSOLVED SULFIDE	<1.0	PPM			
TOTAL CYANIDE	<1.0	PPM			
REACTIVE CYANIDE	<1.0	PPM			
REACTIVE SULFIDE	<1.0	PPM			

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.

IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT AT (414) 764 - 7005 OR CALL TOLL FREE; 1-800-592-5900, WAIT FOR DIAL TONE AND DIAL EXTENSION 332.

ANY REMAINING WASTE SAMPLES WILL BE RETURNED TO THE ADDRESS LISTED ABOVE 8 WEEKS FROM THE RECEIVING DATE OF THIS REPORT.

N/T - NOT TESTED

N/A - NOT APPLICABLE

APPROVAL



DIVISION OF CHEM-BIO CORPORATION

140 EAST RYAN ROAD OAK CREEK, WISCONSIN 53154-4599 (414) 764-7005



SPECIAL WASTE ANALYSIS REPORT

This Report is intended for the sole use and benefit of Waste Management and its companies. No representation concerning significance of the reported data is made to any other person or entity.



WASTE PROFILE SHEET CODE

FROM SAMPLE CONTAINER

LABORATORY NAME: CBC AQUASEARCH

ADDRESS: 140 E. RYAN RD. CRAWFORD, WIS.

LAB MGR. PHONE: 414-764-7005

DATE SAMPLE RECEIVED AT LAB: 6/12/86

DATE SAME TAKEN: 6/12/86

LAB SAMPLE NUMBER ASSIGNED: 26163-312492

CERTIFICATION OF REP. SAMPLE OBTAINED? ☐ YES ☐ NO
CERTIFICATION: Except as explicitly noted, all analytical data reported below were obtained under my direction and supervision, using sample preparation and analytical methods and analytical equipment specified or approved in the most recent "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," SW-846, USEPA Office of Solid Waste. This laboratory follows a quality assurance control program, including a sample chain of custody procedure.

DATE OF REPORT: 6/21/86

SIGNATURE: David Kollakowski

LAB MANAGER NAME: David Kollakowski

PHYSICAL CHARACTERISTICS OF WASTE

SAMPLE VOLUME	COLOR <u>BROWN</u>	ODOR: <input type="checkbox"/> NONE <input checked="" type="checkbox"/> MILD <input type="checkbox"/> STRONG DESCRIBE: <u>SOLVENT</u>	PHYSICAL STATE @ 70°F <input checked="" type="checkbox"/> SOLID <input type="checkbox"/> SEMI-SOLID <input type="checkbox"/> LIQUID <input type="checkbox"/> POWDER	LAYERS <input type="checkbox"/> MULTILAYERED <input type="checkbox"/> BI-LAYERED <input checked="" type="checkbox"/> SINGLE PHASED	FREE LIQUIDS <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO VOLUME <u>0.0%</u>
---------------	-----------------------	---------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------

Test	As Received	Extraction Procedure	Date of Analysis	Test	As Received	Extraction Procedure	Date of Analysis
Specific Gravity	<u>2.00</u>		<u>6/12/86</u>				
pH s.u.	<u>7.8</u>						
Acidity % as							
Alkalinity % as				Phenols, mg/l	<u>2.5</u>		<u>6/12/86</u>
C.O.D. mg/l				Cyanides, as CN Total mg/l	<u><1.0</u>		
B.O.D. mg/l				Cyanides, as CN Free mg/l			
Total Solids @ 105°C	<u>99%</u>			<u>REACTIVE CYANIDE</u>	<u><1.0</u>		
Total Dissolved Solids mg/l	<u>N/I</u>			Nitrogen Ammonia, as N mg/l			
Residue on Evaporation @ 180°C				Total Kjeldahl Nitrogen as N mg/l			
<u>Total Dissolved Solids</u>	<u>N/I</u>			<u>REACTIVE SULFIDE</u>	<u><1.0</u>		
Flash Point F* (closed cup)	<u>>210°</u>			Total Alkalinity, P as CaCO ₃ mg/l			
Ash Content, on ignition (%)	<u>93%</u>			Total Alkalinity M as CaCO ₃ mg/l			
Heating Value, BTU/lb				Total Hardness as CaCO ₃ mg/l			
"Acid Scrub." gNaOH/g				Calcium Hardness, as CaCO mg/l			
				Magnesium Hardness, as CaCO ₃ mg/l			
Arsenic, as As, mg/l	<u>0.024</u>						
Barium, as Ba, mg/l	<u>20</u>						
Bromine as Br, mg/l				Oil and Grease, mg/l			
Cadmium, as Cd, mg/l	<u>1.0</u>	<u>0.023</u>					
Chromium, Total as Cr, mg/l	<u>3.1</u>						
Hexavalent Chromium as Cr, mg/l				Aldrin, mg/l			
Copper, as Cu, mg/l	<u>6.8</u>			Chlorides, mg/l			
Iron, Total as Fe, mg/l				DDT, mg/l			
Iron, dissolved, as Fe, mg/l				Dieldrin, mg/l			
Lead, as Pb, mg/l	<u>16</u>	<u><0.1</u>		Endrin, mg/l			
Manganese, as Mn, mg/l				Heptachlor, mg/l			
Magnesium, as Mg, mg/l				Lindane, mg/l			
Mercury, as Hg, mg/l	<u>0.008</u>			Methoxychlor, mg/l			
Nickel, as Ni, mg/l	<u>12</u>			Toxaphene, mg/l			
Selenium, as Se, mg/l	<u>0.067</u>			Parathion, mg/l			
Silver as Ag, mg/l	<u>0.70</u>			2,4, D, mg/l			
Zinc, as Zn, mg/l	<u>31</u>			2, 4, 5 TP (Silvex), mg/l			
				PCB's, mg/l			
				2, 3, 7, 8, TCDD, ug/l			
Bicarbonates, as HCO ₃ , mg/l							
Carbonates, as CO ₃ , mg/l				<u>3703/16</u>	<u><5.0</u>		
Chlorides, as Cl, mg/l				<u>1/2 SULFIDE</u>	<u>0.04</u>		
Fluorides, as F, mg/l				<u>1/2 CHLORIDE</u>	<u><0.02</u>		
Nitrates, as NO ₃ , mg/l				<u>1/2 MOISTURE</u>	<u>0.65</u>		
Nitrite, as NO ₂ , mg/l							
Phosphate, as P, mg/l							
Sulfate, as SO ₄ , mg/l							
Sulfides, as S, mg/l <u>detected</u>	<u><1.0</u>						



ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

02-25-87

Sample No: 44667

SAMPLE DESCRIPTION: Contaminated Soil

Date Taken: 02-03-87

Date Received: 02-04-87

VOLATILE COMPOUNDS

Acetone	<1.0	ug/g
Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	*	
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	*	
Chloroethane	<10.	ug/g
2-Chloroethyl vinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	*	
1,3-Dichlorobenzene	*	
1,4-Dichlorobenzene	*	
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	16.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g

*Unable to determine; masked by petroleum hydrocarbons

T. Gartner
Toni Gartner, Manager
Rockford Division

Austin Division

2621-130 Ridgepoint Dr.
Austin TX 78754
512-928-8905

Bartlett Division

850 West Bartlett Rd.
Bartlett IL 60103
312-289-3100

Rosner/Runyon Division

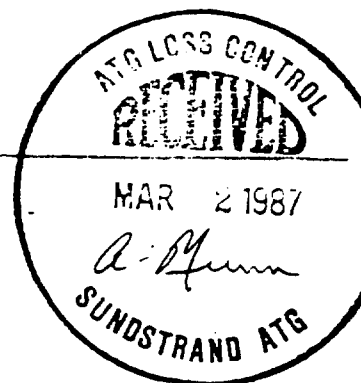
222 South Morgan St.
Chicago IL 60607
312-666-4469

Rockford Division

3548 35th St.
Rockford IL 61109
815-874-2171

Corporate Office

850 West Bartlett Rd.
Bartlett IL 60103
312-289-3100



ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

02-25-87

Sample No: 44667

SAMPLE DESCRIPTION: Contaminated Soil

Date Taken: 02-03-87

Date Received: 02-04-87

VOLATILE COMPOUNDS

Ethylbenzene	*	
Methyl ethyl ketone	<1.0	ug/g
Methylene chloride	<5.0	ug/g
1,1,2,2-Tetrachloroethane	*	
Tetrachloroethene	4.0	ug/g
Toluene	1.3	ug/g
1,1,1-Trichloroethane	27.5	ug/g
1,1,2-Trichloroethane	<1.0	ug/g
Trichloroethene	<1.0	ug/g
Vinyl chloride	<10.	ug/g
Xylenes	*	

*Unable to determine; masked by petroleum hydrocarbons

T. Gartner
Toni Gartner, Manager
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Sundstrand Advanced Technology Group

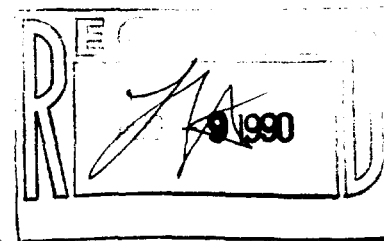
Sundstrand Corporation



4747 HARRISON AVENUE, P.O. BOX 7002 • ROCKFORD, ILLINOIS 61125-7002 • PHONE (815) 226-6000 • TWX 910-531-4255 • TELEX 25-7440



August 3, 1990
EPA90-084



Illinois Environmental Protection Agency
Division of Water Pollution Control
Leaking Underground Storage Tank Section
2200 Churchill Road
P.O. Box 19276
Springfield, IL 62706

RE: Sundstrand ATG, Rockford IL
Winnebago County
Incident #901902

Dear Sir:

Following is our response to your form letter which we received on July 17, 1990, requesting additional information on our reported release (7/10/90) of JP4.

1. The two stainless steel underground storage tanks in question appear to have leaked JP4 jet fuel at an undetermined time in the past. Quantity of JP4 released is not known.
2. See attachment number 1.
3. See attachment number 1.
4. Not believed applicable at this time.
5. Three soil samples were taken to date as indicated on Attachment #1. Sample SS3 was taken as a surface sample to a depth of one to three inches along the base of the north wall of the excavation. Sample SS2 was collected at approximately 13 feet at the base of the south wall on the south side outside the containment structure of the excavation. Sample 4 was taken below the concrete floor of the containment bunker in the south center. It consisted of a one foot composite sample. All samples were turned in to CBC of Oak Creek, Wisconsin for analysis. The analytical results for Samples SS3 and SS2 indicate less than 4 ppm of total petroleum hydrocarbons. Sample SS4 is not back yet. See attachments 2 and 3. An HNU meter was used to field test Sample SS4 and the boring it came from with negative results.
6. See enclosed attachment 4.

In addition to the above:

1. The east UST's in question had already been out of service prior to leak testing and excavation. The east tank failed the leak test. Attached are leak test results (attachment 5).
2. These tanks were positioned in a bunker constructed of concrete. It had poured concrete walls on the east, west and south, with a poured concrete floor which sloped to the south. The north wall was soil.
3. Not applicable.
4. Excavated backfill has to be stockpiled on 8-mil plastic sheeting with built up edges to facilitate containment, then covered with 8-mil plastic. Sample SS1 results were received from the laboratory (see attachment 6) and a determination of non-hazardous on the fill's status was made. Fill will be disposed of in bulk to Adams Center Landfill in Fort Wayne, Indiana.
5. See Item #5 in previous section.
6. Not applicable. At the time of this submission no free product has been found.

Should the analytical results from Sample SS4 indicate the lack of total petroleum hydrocarbon, the excavation will be backfilled and the replacement tank installed. If you have any questions or require additional information, please contact me at (815)226-6934.

Sincerely,



Al Munn
Environmental, Health
and Safety Manager

AM:ns1

cc: Illinois State Fire Marshal
UST Section
1035 Stephenson Drive
Springfield, IL 62703

Illinois ESDA

Complete this form.

**Contingency Plan
Leaking Underground Storage Tank Problems**

City Rockford Incident # 901902
Site Name Sundstrand ATG
Address 4747 Harrison Ave.
Rockford, Illinois
Site Phone (815) 226-6000

Person representing the site with authority to approve remediation expenditures in an emergency
Al Munn

Phone (815) 226-6000
After-hours Phone (815) 226-6000

Contractor Hired for Tank Removal International Piping Systems
Phone (708) 671-7725
After-hours Phone Same

Contractor Available for Emergency Response SAME
Phone _____
After-hours Phone _____

In case of Additional Petroleum Product spillage or discovery of products or vapors in the
Sewers, Streams, and/or Buildings **IMMEDIATELY** Notify all the Following:

Local Fire Department Rockford Fire Dept. Phone (815) 964-3321

Local Police Department Rockford Police Dept. Phone (815) 987-5800

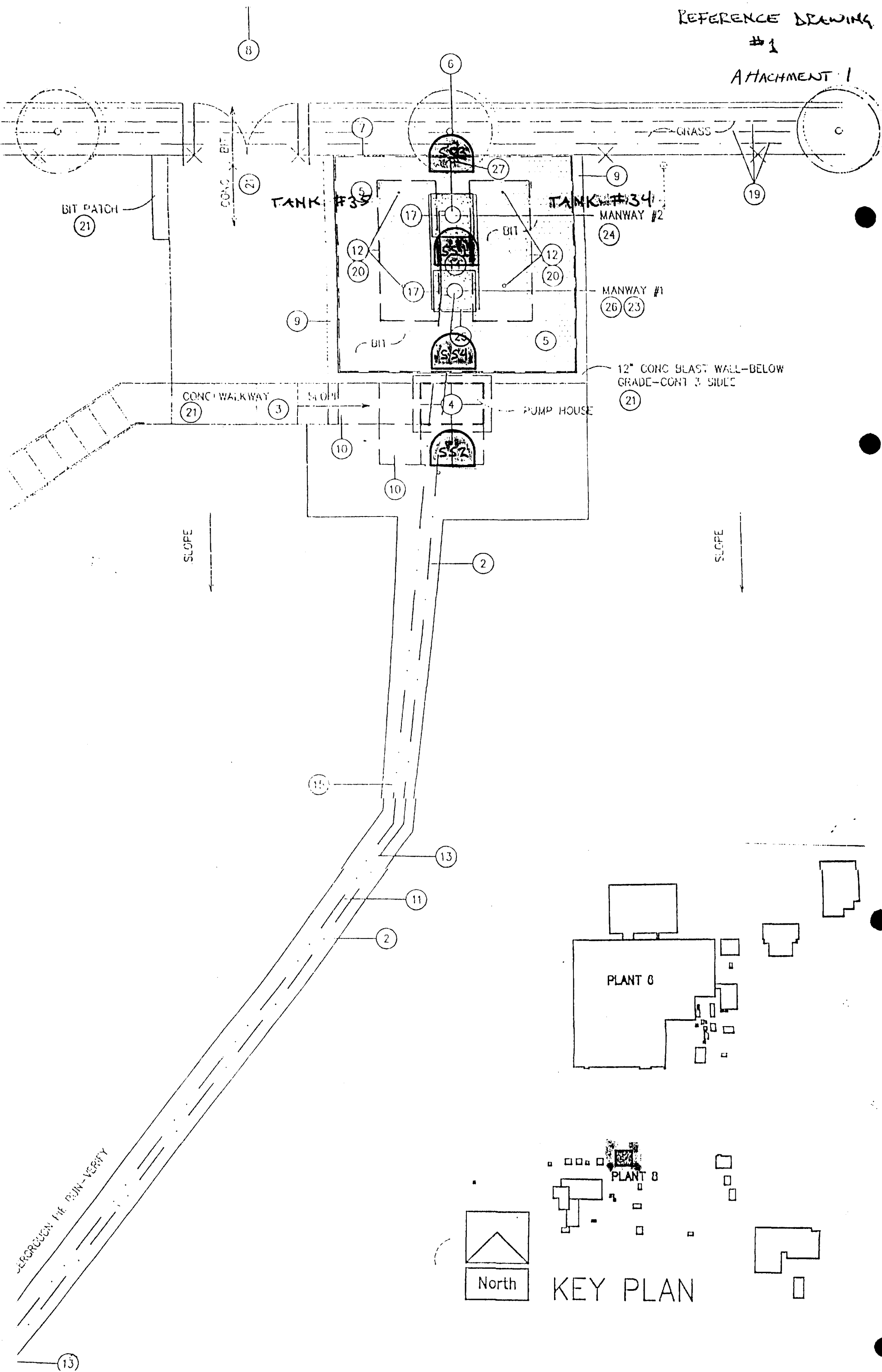
Sewer Authority Rock River Reclam. District Phone (815) 397-9700
After-Hours Phone (815) 397-9422

Illinois Emergency Services and Disaster Agency and ask for the IEPA Duty Officer
Phone 800/782-7860

Confirm that the emergency contractor is available and willing to respond to this site. Then post the original
in a prominent place for your employees and send the carbon to:

IEPA-ERU #29
2200 Churchill Road
Post Office Box 19276
Springfield, Illinois 62794-9276

Illinois Environmental Protection Agency — Emergency Response IEPA-ERU
Phone 217/782-3637





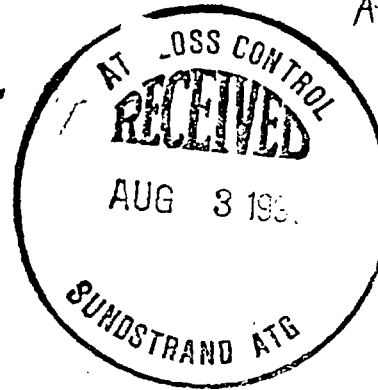
CHEM-BIO CORPORATION

140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

ENVIRONMENTAL SERVICES

07/31/90

LABORATORY REPORT



ATTACHMENT #2

PAGE 1

S403 8452731 W31

SOIL SAMPLE #3



SUNDSTRAND, AVIATION OPERATIONS
4747 HARRISON AVE POBOX 7002
ROCKFORD, IL 61125
ATTN: JEFF LINDSTROM

SAMPLE 90198-S16357 NORTH WALL BASE/PLANT 8/SOIL
DATE COLLECTED 07/12/90 DATE RECEIVED 07/17/90

TEST NAME	RESULT	UNITS
TOTAL PETROLEUM HYDROCARBONS	<4.0	PPM

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED.

N/T = NOT TESTED

N/A = NOT APPLICABLE

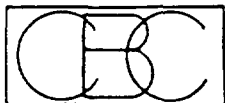
WI DNR LAB CERTIFICATION #241283020

APPROVAL M.L.

FAX #414-764-0486

CLIENT SERVICES DIRECT LINE 414-768-7460

1-800-365-3840



CHEM-BIO CORPORATION
140 EAST RYAN ROAD

ENVIRONMENTAL SERVICES

OAK CREEK, WI 53154-4599 (414) 764-7005

07/31/90

LABORATORY REPORT



ATTACHMENT #3

PAGE 1

S403 8452731 W31

SUNDSTRAND, AVIATION OPERATIONS
4747 HARRISON AVE POBOX 7002
ROCKFORD, IL 61125
ATTN: JEFF LINDSTROM

SOIL SAMPLE #2

SS2

SAMPLE 90198-S12491 SOUTH WALL BASE OUTSIDE/PLANT 8/SOIL
DATE COLLECTED 07/12/90 DATE RECEIVED 07/17/90

TEST NAME	RESULT	UNITS
TOTAL PETROLEUM HYDROCARBONS	<4.0	PPM

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED.

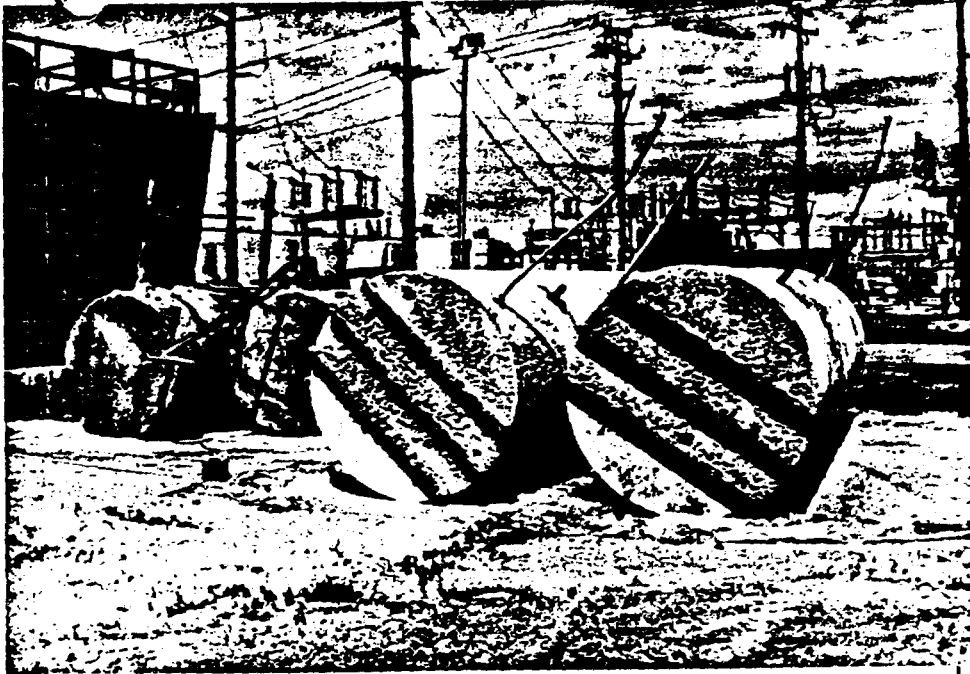
N/T = NOT TESTED ~~WI DNR LAB CERTIFICATION #141283026~~ N/A - NOT APPLICABLE

FAX #414-764-0486

CLIENT SERVICES DIRECT LINE 414-768-7460

APPROVAL M.T.

1-800-365-3840



Inspection Number

PLANT 8 U.S.T. REMOVAL

1. Photo ID Number
NEGATIVE #82. Date/Time
JULY 9, 1990

3. Location (Photo and Photographer)

PLANT 6 SOUTH OF COOLING TOWER
FACING EAST.

4. Description

LEFT TO RIGHT

TANK #37 TOLUENE

TANK #19 GASOLINE

TANK #34 JP4

TANK #35 JP4

5. ☐ Confidential Materials

Cont

1. Photo ID Number
NEGATIVE #112. Date/Time
JULY 10, 1990

3. Location (Photo and Photographer)

EAST OF PLANT 8

7. Description

CONTAINMENT, BERMING & COVERING
FOR SOIL REMOVED FROM TANK #34 & 3
EXCAVATION SITE.8. ☐ Confidential Materials

Cc



Inspection Number

PLANT 8 U.S.T. REMOVAL

1. Photo ID Number

NEGATIVE #12

2. Date/Time

JULY 10, 1990

1. Location (Photo and Photographer)

RETENTION AREA EAST OF PLANT 8
FACING EAST.

2. Description

CONTAINMENT AND COVERING
FOR SOIL REMOVED FROM TANK
#34 & 35 EXCAVATION SITE.3. ☐ Confidential Materials

Cont.

1. Photo ID Number

NEGATIVE #17

2. Date/Time

JULY 10, 1990

1. Location (Photo and Photographer)

TANK #34 & 35 EXCAVATION SITE

2. Description

"CONTAINMENT WALL (SOUTH) WITH
PIPING PENETRATIONS TO SUMP PIT
SHOWN IN CENTER OF PHOTO3. ☐ Confidential Materials

Cont.

Inspection Number

PLANT 8 U.S.T. REMOVAL

1. Photo ID Number

NEGATIVE #18

2. Date/Time

JULY 10, 1990

Location (Photo and Photographer)

TANK #34 & 35 EXCAVATION SITE

Description

SUMP PIT SOUTH OF "CONTAINMENT"

AREA FOR TANK #34 & 35

8. ☐ Confidential Materials

Cont.

1. Photo ID Number

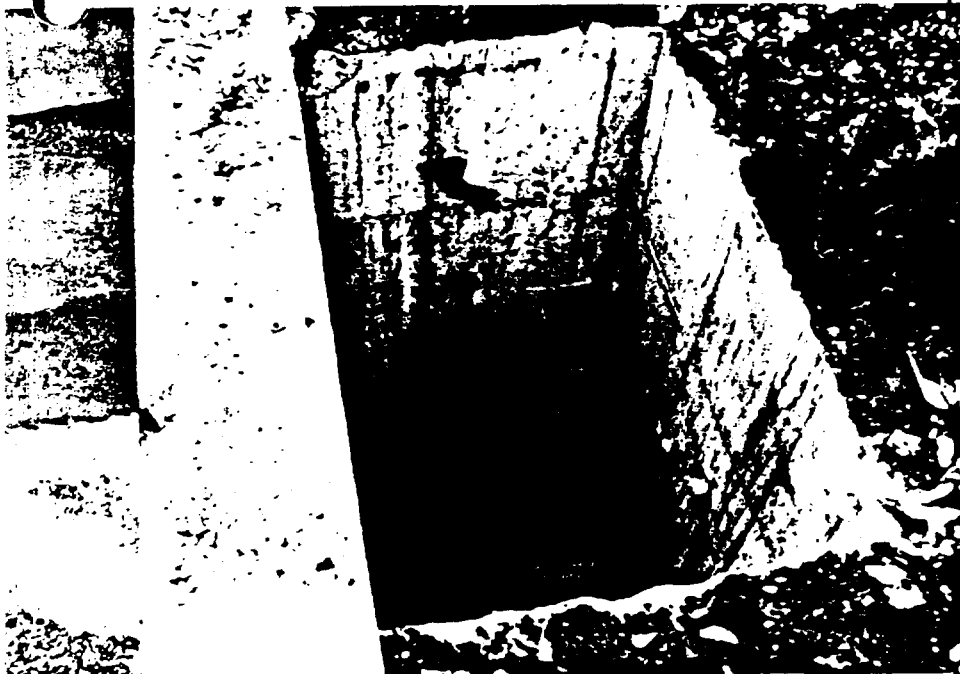
2. Date/Time

6. Location (Photo and Photographer)

7. Description

8. ☐ Confidential Materials

Cont.



The first test result was inconclusive. Al suggested opening the lines down to Plant 8, and doing the second level test, so he could see if there was any indication of a leak in the piping run. The second level test was showing a boarder line leak. It was determined that it would tank approximately 12 hours to get all of the data needed to get conclusive results. Rather than waiting the entire time, JND collected 2 hours of data on the second test to send to Acutest. At the end of the day JND could not be sure the tank was either tight or leaking. From the JND data, Acutest was able to determine that the system shows no indication of a leak. JND results show a leak rate at 59" of 0.00 gallons per hour.



ENVIRONMENTAL SERVICES

CHEM-BIO CORPORATION

140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

07/27/90

LABORATORY REPORT

PAGE 1

S403 8452495 S16

SOIL SAMPLE #1

SUNDSTRAND, AVIATION OPERATIONS
4747 HARRISON AVE POBOX 7002
ROCKFORD, IL 61125
ATTN: JEFF LINDSTROM

SAMPLE 90193-S12491 TANKS #34 & #35 JP-4 WASTE
DATE COLLECTED 07/10/90 DATE RECEIVED 07/12/90

TEST NAME	RESULT	UNITS	EP RESULT	TCLP RESULT	LIMIT
ARSENIC-TCLP	<0.010	MG/L			5.0
BARIUM-TCLP	0.13	MG/L			100.0
CADMIUM-TCLP	<0.02	MG/L			1.0
CHROMIUM-TCLP	<0.02	MG/L			5.0
LEAD-TCLP	<0.20	MG/L			5.0
MERCURY-TCLP	<0.0004	MG/L			0.2
SELENIUM-TCLP	<0.020	MG/L			1.0
SILVER-TCLP	<0.02	MG/L			5.0
COPPER - TCLP	<0.02	MG/L			
NICKEL - TCLP	0.06	MG/L			
ZINC - TCLP	<0.02	MG/L			
PH (UNITS)	9.6				2.0-12.5
	PH MEASURED AS SOLID IN WATER.				
TOTAL CYANIDE	<10	MG/L			
TOTAL SULFIDE	<2	MG/L			
FLASH POINT (FAHRENHEIT)	>210	DEG. F			140.0
	OPEN - CUP				
FREE LIQUIDS	0	%			
TCLP EXT. NON-VOLATILE				COMPLETE	PPM
	7-17-90				

PLEASE CONTACT CLIENT SERVICES WITH ANY QUESTIONS. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT ; NON-WATER SAMPLES WILL BE RETURNED 6 WEEKS AFTER RECEIPT.

IL EPA CERTIFICATION # 100243; AIHA ACCREDITED.

N/T = NOT TESTED

N/A = NOT APPLICABLE

APPROVAL

WI DNR LAB CERTIFICATION #241283020

FAX #414-764-0486

CLIENT SERVICES DIRECT LINE 414-768-7460

1-800-365-3840

MLM 272-83

memo

Sundstrand

Corporation



TO: Leonard Grunow 574

FROM: Owen Briles 784 OB

SUBJECT: Storm Drain Water Sample

DATE: Sept. 2, 1983

COPIES: R. Waxler 779-6
J. Johnson 581-6
F. Granstra 784
W. Leeming 784

A sample of water from the south storm drain at Plant 8 was collected and submitted to the laboratory after an exhaust collection tank overflowed during Run #55, Cell #5. There was concern that chemicals from the collection tank might have gotten in the storm drain. The sample would not turn blue or red litmus and the pH was found to be 7.3. This information indicates that no significant amounts of hydrochloric acid or potassium hydroxide from the collection tank reached the storm drain system.

OMB:vl

SANITARY DISTRICT OF ROCKFORD

ACCIDENTAL DISCHARGE REPORTING FORM

This form must be completed and returned to the District Director within fifteen (15) days following the report of an accidental or deliberate discharge to the sanitary sewer. Completion of this form is a requirement of Ordinance 361 (Article IV, Section 10C) and does not relieve the User of any liabilities due to the accidental discharge. Prompt and accurate reporting does reflect that the User is attempting to address the problem.

Company Name: Sundstrand Aviation Operations

Address: 4747 Harrison Avenue Phone: 226-6000

Person completing this form: Al Munn

Title: Environmental Analyst

Time and Date accidental discharge started and stopped:

Started am/pm on March 12, 1985 (date) and

stopped am/pm on March 19, 1985 (date).

Type of material spilled: Stoddard Solvent

Volume of spill (give units): 400 gallons

Chemical analysis of a representative sample of the spilled material. Show concentration of all compounds in the spilled material. If a sample of the spilled material is not available, list all known contents present in the discharged material.

COMPOUND	CONCENTRATION (mg/l)
<u>Stoddard Solvent</u>	<u>100%</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

Location of accidental discharge:

Plant process area _____ Material Storage area _____

In-plant transfer area X Shipping/Receiving area

Other (specify) Under floor (in trench) transfer piping.

Is spill containment present in the area where the accidental discharge occurred?

Yes _____ No X

Is spill containment present in other areas within the plant?

Yes X No _____

Describe the cause of the reported discharge:

A leaking transfer pipe.

Describe what actions were taken at the time to control the spill (eg. sealed floor drain, use of sorbants or foams, etc.):

Section of leaking pipe isolated and shut off.

Did the spill receive any type of treatment?

Yes _____ No X

If yes, please describe:

Was any part of the spill contained and prevented from discharge to the sanitary sewer? Yes _____ No X

If yes, please describe how that waste was disposed.

Describe fully what measures will be taken to prevent similar accidents in the future.

Section of leaking pipe isolated and shut off. Pipe will be permanently disconnected and capped.

Anticipated time schedule in which the above-stated measures will be completed.

Immediately.

This accidental discharge was reported to the District on March 20, 1985 (date)

at 10:00 am/pm by Al Munn (name),

Environmental Analyst (title).

OFFICE MEMORANDUM

Date: April 6, 1987

Ref: ~~EPA~~87-014

cc: Al Munn
Mike Klockenga
Mark Chiado

TO: Jim Barry

FROM:


Jeff Lindstrom

SUBJECT: Tank #12 Perchloroethylene Spill

The following is a list of events which identified and determined the disappearance of approximately 1000 gallons of Perchloroethylene on April 1, 1987.

1. Pump #12 failed and had to be replaced (pump, packing, seals, bearings and shaft destroyed or damaged).
2. Old pump was replaced. Maintenance man could not prime new pump. Lubrication man gauged tank at 5" which is equal to 190 gallons of product. (Records showed that the tank should contain 1300 gallons.)
3. Piping system was isolated from tank to fill house inside Plant #6 and pressure tested at 80 psi for 14 hours. The test indicated no pipe leakage.
4. The tank was pressure tested at 3 psi for 1 hour. This test also indicated that the tank did not leak.
5. Samples of the waste oil tanks were taken to determine if the Perchloroethylene leaked into the waste tanks through the 4" floor drain in the pump house. The pump failure would have caused the solvent to collect in the drain which is connected to a manhole which drains into each of the oil tanks.

6. Material Lab analysis of each tank sample indicated concentrations of Perchloroethylene as follows:

- a. North waste tank - 5% of 4000 gallons of waste in the tank.

$$\frac{?}{4000} = \frac{5}{100} = 200 \text{ gallons of Perc}$$

- b. South waste tank - 25% of 3000 gallons of waste in the tank.

$$\frac{?}{3000} = \frac{25}{100} = 750 \text{ gallons of Perc}$$

This accounts for 950 gallons of the 1100 gallons lost from the solvent tank.

7. Illinois Pollution Control (IPC) will be called in to "skim" off the oil waste above the Perc level in each tank.
8. The remaining Perc contaminated liquid will be drained and sent to Safety Kleen Corporation for recycling.
9. The Perc tank is scheduled for removal during the 3rd quarter of 1987 and will not be refilled.

JL/jw



ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

04-08-87

SAMPLE DESCRIPTION: Waste Oil

Date Received: 04-03-87

45891	North, 4 inch bottom, waste tank	04-02-87	
	Tetrachloroethene	41.9	% by vol
45892	#2 South Tank	04-02-87	
	Tetrachloroethene	55.5	% by vol

Tom Gartner, Manager
Rockford Division

Austin Division	Bartlett Division	Rosner/Runyon Division	Rockford Division	Corporate Office
2621-130 Ridgepoint Dr. Austin TX 78754 512-928-8905	850 West Bartlett Rd. Bartlett IL 60103 312-289-3100	222 South Morgan St. Chicago IL 60607 312-666-4469	3548 35th St. Rockford IL 61109 815-874-2171	850 West Bartlett Rd. Bartlett IL 60103 312-289-3100

OFFICE MEMORANDUM

April 8, 1987
JPB-04-87-01

TO: Arnie Havens

CC: E. Englof

FROM: Jim Barry

SUBJECT: Monthly Activity Report, March 1987

- 1000 gallons of Perchloroethylene was unaccounted for 4/1 in tank #12 at plant 6. Piping and tanks were pressure tested to eliminate possibility of leaks. They tested good. Further investigation located the Perchloroethylene in waste tanks connected to drainage system from the pump house. Pump leakage was determined to be cause. The present system has been de-commissioned and will be dug up as part of our underground tank removal plan. Perchloroethylene will become part of the barrel storage system and will not have bulk storage.
- We have several programs requesting service which will not happen unless more help is forthcoming as schedules are relieved.
- We are gearing up for 3 shift-6 days/week operation and support of Electric Power programs. Will cause a few more factory headcount and impact in the support office areas.
- Plant 1 preproduction shop construction activity will continue to a practical stopping point. All other activity is on hold until further notice.

JPB:ns1

SOIL PILE SCHEDULE OF EVENTS

Team

L. Aylward
 R. Miller
 A. Munn
 J. Barry

Date Complete

- | | | |
|-------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12/21 | o December 21- | Decision of team to file Part A and closure plan after disposal. |
| 12/26 | o December 26- | Part A was submitted to IEPA without consultant review to be as timely as possible. |
| 1/2 | o January 2 - | HLA started to determine proper closure plan for soil pile including a review of current storage until disposal takes place. |
| 1/4 | o January 4 - | After HLA review, some data on the Part A will need revision. |
| 1/9 | o January 9 - | Site visit by HLA and discussion. |
| | o January 15 - | Preliminary closure plan and ROM costs due from HLA. Plan to include any interim revisions to storage area. |
| | o January 15 - | If revision of the soil pile storage is required, start immediately to beat spring runoff issue. (It may be months before authorization to proceed with remediation is received.) |
| | o January 18 - | Submit revised Part A by this date. This revision is awaiting the results of an HLA/IEPA conversation this week. |
| | o January 25 - | Final closure plan available for review. |
| | o January 31 - | Submittal of closure plan to IEPA. |
| | o January 31 - | Work with HLA/IEPA to get Part A and closure plan processed. |
| | 90 Days? | Once Part A and closure plan is approved, proceed. |

1/14/91

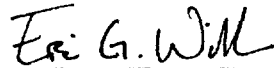
A Report Prepared for

Sundstrand Corporation
Law Department
4949 Harrison Avenue
Rockford, Illinois

SUMMARY REPORT
PLANT 6 FACILITY TANK FARM AREA INVESTIGATION
SUNDSTRAND AEROSPACE FACILITY
SUNDSTRAND CORPORATION
ROCKFORD, ILLINOIS
SUNDSTRAND PROJECT NUMBER 5-8323

HLA Project No. 19356,015.23

By



Eric G. Williams
Senior Hydrogeologist



Michael J. Malley
Principal Geochemist

Harding Lawson Associates
550 Frontage Road, Suite 395
Northfield, Illinois 60093
(708) 501-5510

February 26, 1991

INTRODUCTION

Sundstrand Aerospace (Sundstrand) is in the process of implementing a project that includes the construction of an on-site power generating station (the Station) at its Plant 6 facility, 4949 Harrison Avenue, Rockford, Illinois. The Station would place less demand on the local utility and comply with non-mandatory Environmental Protection Agency (EPA) initiatives to improve overall air quality.

The 50 foot by 100 foot station is to be located north of the boiler room at Sundstrand's Plant 6 facility (the Site) as shown on Figure 1. This area is the most practical location, promoting the most efficient system operation. Prior to construction of the Station, Sundstrand contracted Harding Lawson Associates to conduct a soil investigation in the area of the proposed Station location. The purpose of the investigation was to assess the nature and extent of chemicals, if any, in soil remaining after extensive soil excavation activities at the Site. This report presents the results of this soil investigation, discusses the potential impact of chemicals detected in soil on underlying groundwater, and presents summary statements regarding clean-up options for the Site.

SITE BACKGROUND

In June of 1990, Sundstrand conducted an investigation of an underground storage tank (UST) farm area located north of the boiler room during which three USTs containing virgin Stoddard Solvent, virgin PCE, and waste oil were excavated and removed from service. Approximately 2200 cubic yards of soil were excavated from the tank farm area and set aside for treatment which is being addressed under a separate plan. During the excavation activities, Sundstrand collected soil samples from the excavated soil and submitted these samples for chemical analysis of certain volatile organic compounds (VOCs). Results of these analyses indicated the presence of tetrachloroethene (PCE) and 1,1,1-trichloroethane (TCA) in soil ranging in concentration from 0.070 to 1100 milligrams per kilogram (mg/kg).

Excavations at the Site created from UST removal activities were backfilled with clean fill. A new UST was installed in the area prior to backfilling. The new tank was installed in compliance with the new federal UST regulations.

SOIL INVESTIGATION

In January of 1991, HLA performed a soil investigation of the Site. Fourteen soil borings were completed at the locations shown on Figure 2. The soil borings were completed to bedrock and 29 soil samples were collected for chemical analysis.

All of the soil samples were tested for Hazardous Substance List (HSL) VOCs using EPA Method 8240 and Total Petroleum Hydrocarbons (TPH) using a modified Method EPA 8015. In addition, 11 of the samples were also tested for HSL metals and cyanide using EPA Method 3010.

The results of the laboratory analysis are summarized in Tables 1 and 2. VOCs detected in soil samples include PCE, TCA, cis-1,2-dichloroethene, 1,1-dichloroethane, 1,1-dichloroethene, trichloroethene, xylene, and toluene. TPH as Stoddard Solvent was detected in one soil sample. PCE and TCA were detected most frequently and at higher concentrations than the other organic chemicals. In all but one boring, however, concentrations of PCE and TCA were relatively low, with maximum observed levels of 170 and 130 mg/kg, respectively. In the one boring with higher levels (SB-7), the maximum observed concentrations of PCE and TCA were 1600 and 960 mg/kg, respectively. Based on the analytical results, the majority of the soil containing chemicals was removed during the June 1990 tank and soil excavation activities.

Subsurface materials encountered during the boring program ranged from sandy silts to silty sands with some small gravel. Auger refusal on dolomite bedrock was encountered in the soil borings at depths ranging from 11.5 to 18 feet below the ground surface; however, weathered bedrock was encountered at lesser depths. Saturated material was encountered just above bedrock in six of the 13 soil borings that were completed to bedrock.

DISCUSSION

Although saturated material was encountered in six of the soil borings, it is unknown if this water represents regional groundwater. Previous work conducted in this area by HLA indicates that the depth to the regional groundwater table is generally 30-40 feet below ground surface. The saturated material found in the soil borings may be representative of water that has infiltrated downward from the surface and perched above the bedrock.

Approximate concentrations of chemicals that may be found in groundwater can be calculated from chemical concentrations in soil using the soil/water distribution coefficient (K_d) for a given chemical. As a conservative approach to modeling, PCE and TCA were used because these compounds were detected in highest concentrations at the site; therefore, if PCE and TCA do not impact groundwater, other chemicals do not likely impact groundwater. The K_d values for PCE and TCA at the Site are 364 and 152, respectively. These K_d values were calculated based on published values for the organic content adsorption constant (K_{oc}) for TCA and PCE, and an estimated value of 1.0% for the organic carbon content of the soil (f_{oc}) at the Site (Loehr, et al 1990, Mobility and Degradation of Residues at Hazardous Waste Land Treatment Sites at Closure, USEPA/600/52-90/018). The K_d values were then calculated using the formula $K_d = K_{oc} * f_{oc}$.

Based on the calculations described above, none of the concentrations of PCE or TCA in the 29 soil samples analyzed would be high enough to result in concentrations of PCE or TCA in groundwater above the maximum contaminant level for drinking water (MCL) of 200 mg/L for TCA or above the proposed MCL of 5 mg/L for PCE. Table 3 presents a summary of the K_d calculations.

Sundstrand currently has an operating groundwater remediation system and a groundwater monitoring program at the Plant 6 facility. The remediation system consists of three groundwater pumping wells and an air stripping tower to remove VOCs. There is also an extensive network of groundwater monitoring wells at the Plant 6 facility with 33 of the wells within 1500 feet radius of the

Site. These monitoring wells and pumping wells are completed in the shallow alluvial and bedrock groundwater system to depths up to 100 feet below ground surface. The nearest groundwater remediation pumping well to the site is approximately 250 feet southwest of the Site. The nearest monitoring wells are a group of three monitoring wells located near the pumping well.

A public water supply well is located northwest of the Sundstrand property boundary, approximately 1500 feet from the site. Although the well is approximately at the 1500 foot radius, its completion depth according to the Illinois State Water Survey is 1310 feet below ground surface. Figure 1 presents the locations of Sundstrand's groundwater treatment system wells, monitoring wells, and public water supply wells within 1500 feet of the Site. Figure 3 presents a site plan showing the location of Sundstrand's groundwater remediation system.

Based on data from the monitoring wells at the Plant 6 facility, groundwater generally flows in a southwesterly direction. A groundwater remediation pumping well is located approximately 250 feet down gradient from the Site. Preliminary hydrogeologic data suggests that the pumping wells located southwest of the site are influencing groundwater flow below the Site.

As discussed above, future plans for the Site include construction of a power generating station on a portion of the Site. The remainder of the Site will be capped with asphaltic concrete. By capping the Site with the building and the asphaltic concrete, exposure to soils beneath the Site is highly unlikely. In addition, potential migration of chemicals in the soil will be limited because surface water infiltration from the Site is significantly reduced. The facility is also completely fenced and secured by guards.

SUMMARY

HLA believes that clean-up criteria should be set for the Site that would allow soil beneath the Site to remain in place and untreated for the following reasons:

- o The majority of the soil containing detectable levels of chemicals from the USTs has been removed from the Site. This soil is scheduled for treatment and offsite disposal under a

separate project in conjunction with the IEPA. Soil that remains in place generally contains concentrations of chemicals below 200 ppb.

- o The Site will be capped by construction of a building and installation of asphaltic concrete, and the facility is completely fenced and secured by guards. Exposure to soils would be significantly reduced and migration of chemicals would be effectively mitigated.
- o Based on calculations using the distribution coefficients of PCE and TCA, it is not likely that groundwater beneath the Site has been or will be significantly impacted by site activities.
- o There is an operating groundwater remediation system in a down-gradient direction from the Site. Preliminary data suggest that groundwater flow below the site is influenced in the direction of the system. There is an extensive on-going groundwater monitoring program at the Plant 6 facility.
- o Construction of the power generating station is an important project that would place less demand on the local utility and comply with non-mandatory EPA initiatives to improve overall air quality. Clean-up objectives set below concentrations that exist in soils at the Site would further delay the project.
- o Because levels of detected chemicals are low, and applicable remedies for treating these chemicals generally are inefficient at these levels (e.g. vapor extraction, bioremediation), applicable remedial alternatives may provide little or no reduction of existing chemical concentrations and are not likely to be cost efficient.

DISTRIBUTION

SUMMARY REPORT
PLANT 6 FACILITY TANK FARM AREA INVESTIGATION
SUNDSTRAND AEROSPACE FACILITY
SUNDSTRAND CORPORATION
ROCKFORD, ILLINOIS
February 26, 1991

Copy No. _____

	<u>Copy No.</u>
10 copies: Ms. Linda Aylward, Esq. Environmental Counsel Sundstrand Corporation Law Department 4949 Harrison Avenue Rockford, Illinois 61108	1-10
2 copies: Job File	10-12
1 copy: QC/Bound Report File	13

EGW/mjs

QUALITY CONTROL REVIEWER



Robert W. Dennis
Principal Engineer

Table 1
Chemical Analysis Results
Volatile Organic Compounds & Total Petroleum Hydrocarbons
Plant 6 Tank Farm Area
Sundstrand Aviation, Rockford, Illinois

SOIL BORING	SAMPLE NUMBER	SAMPLE DEPTH	CHEMICAL	CONCENTRATION (UG/KG)
SB-1	SS-1	5'	ND	
	SS-2	10'	Tetrachloroethene	6.8
			1,1,1-Trichloroethane	25
	SS-3	14'	cis-1,2-Dichloroethene	15
			Tetrachloroethene	18
1,1,1-Trichloroethane			130	
SB-2	SS-1	5'	Tetrachloroethene	7.7
	SS-2	10'	Tetrachloroethene	6.3
	SS-3	Sample not obtained		
SB-3	SS-1	5'	ND	
	SS-2	10'	Tetrachloroethene	29
	SS-3	14'	Tetrachloroethene	15
SB-4	SS-1	5'	Tetrachloroethene	130
			1,1,1-Trichloroethane	100
	SS-2	10'	Tetrachloroethene	62
			1,1,1-Trichloroethane	45
	SS-3	15'	cis-1,2-Dichloroethene	5.3
			Tetrachloroethene	170
1,1,1-Trichloroethane			100	
SB-5	No samples obtained			
SB-6	SS-1	5'	Tetrachloroethene	31
			1,1,1-Trichloroethane	30
	SS-2	10'	Tetrachloroethene	13
			1,1,1-Trichloroethane	22
	SS-3	Sample not obtained		

- Notes:**
1. Only chemical concentrations above method detection limits are listed.
 2. ug/kg = micrograms per kilogram
 3. ND = Not detected above method detection limit

Table 1 con't
Chemical Analysis Results - Volatile Organic Compounds
Plant 6 Tank Farm Area
Sundstrand Aviation, Rockford, Illinois

SB-7	SS-1	5'	1,1-Dichloroethane	14
			Tetrachloroethene	110
			1,1,1-Trichloroethane	270
	SS-2	10'	1,1-Dichloroethane	16
			cis-1,2-Dichloroethene	72
			Tetrachloroethene	480
			Toluene	9.1
			1,1,1-Trichloroethane	740
			1,1,2-Trichloroethane	22
			Trichloroethene	18
			Xylenes	15
	SS-3	14'	1,1-Dichloroethane	15
			cis-1,2-Dichloroethene	84
			Tetrachloroethene	1600
			Toluene	64
			1,1,1-Trichloroethane	960
			1,1,2-Trichloroethane	110
			Trichloroethene	35
			Xylenes	66
SB-8	SS-1	5'	Tetrachloroethene	53
			1,1,1-Trichloroethane	21
	SS-2	Sample not obtained		
	SS-3	Sample not obtained		
SB-9	SS-1	5'	Tetrachloroethene	31
			1,1,1-Trichloroethane	34
			Xylenes	7.2
	SS-2	10'	Tetrachloroethene	16
			1,1,1-Trichloroethane	27
	SS-3	14'	Tetrachloroethene	12
			1,1,1-Trichloroethane	8.1

Notes:

1. Only chemical concentrations above method detection limits are listed.
2. ug/kg = micrograms per kilogram
3. ND = Not detected above method detection limit

Table 1 con't
 Chemical Analysis Results - Volatile Organic Compounds
 Plant 6 Tank Farm Area
 Sundstrand Aviation, Rockford, Illinois

SB-10	SS-1	5'	Tetrachloroethene	11
			1,1,1-Trichloroethane	7.2
	SS-2	10'	Tetrachloroethene	41
			1,1,1-Trichloroethane	19
	SS-3	14'	Tetrachloroethene	81
1,1,1-Trichloroethane			46	
SB-11	SS-1	5'	1,1,1-Trichloroethane	10
	SS-2	10'	Toluene	6.3
			1,1,1-Trichloroethane	15
			Xylenes	16
	SS-3	Sample not obtained		
SB-12	SS-1	5'	Tetrachloroethene	5.8
			TPH as Stoddard Solvent	0.037
	SS-2	10'	1,1,1-Trichloroethane	7.2
			Xylenes	6.3
	SS-3	Sample not obtained		
SB-13	SS-1	5'	Tetrachloroethene	9.7
			1,1,1-Trichloroethane	29
	SS-2	10'	ND	
	SS-3	Sample not obtained		
SB-14	No samples obtained			

- Notes:
1. Only chemical concentrations above method detection limits are listed.
 2. ug/kg = micrograms per kilogram
 3. ND = Not detected above method detection limit

Table 2
Chemical Analysis Results
Metals & Cyanide
Plant 6 Tank Farm Area
Sundstand Aviation, Rockford, Illinois

	SB-1, SS-2	SB-2, SS-2	SB-3, SS-2	SB-4, SS-2	SB-6, SS-2	SB-7, SS-2	SB-9, SS-2	SB-10, SS-2	SB-11, SS-2	SB-12, SS-2	SB-13, SS-2
Cyanide, Total	0.09	0.13	0.06	0.10	0.10	0.08	0.08	0.08	0.09	0.14	0.03
Aluminum	1,000	1,000	1,600	2,450	1,750	1,600	1,250	1,850	1,600	1,250	1,300
Antimony	<10.	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arsenic	1.63	0.58	1.06	<0.50	1.16	1.70	1.63	2.36	1.00	0.58	1.76
Barium	<0.50	0.47	10.40	13.50	4.10	<0.46	98.60	205.00	<0.01	35.40	<0.47
Beryllium	195.00	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50
Cadmium	1.74	1.85	1.21	1.73	1.52	1.83	1.10	1.21	0.63	0.53	1.64
Calcium	85,075	97,630	67,100	85,654	76,230	102,294	62,544	64,593	41,700	32,882	79,907
Chromium, Total	8.16	5.88	28.00	5.78	4.47	5.92	8.86	7.03	5.50	3.54	4.14
Cobalt	11.0	13.5	9.0	8.0	7.0	9.5	12.5	10.0	6.0	7.5	7.0
Copper	7.41	6.26	7.45	7.60	6.31	8.35	9.96	10.10	14.20	9.61	5.65
Iron	2,488	4,076	2,597	4,346	4,139	5,505	5,300	6,699	4,000	4,192	3,925
Lead	21.4	23.2	17.8	21.1	17.2	30.7	21.2	23.8	15.8	11.0	27.1
Magnesium	50,249	59,242	49,784	49,789	39,344	57,798	31,448	28,975	212,000	19,213	48,598
Manganese	381.00	183.00	176.00	163.00	171.00	198.00	224.00	815.00	172.00	0.21	160.00
Mercury	0.01	<0.01	<0.01	0.02	0.02	0.09	<0.01	<0.01	<0.01	0.01	<0.01
Nickel	18.4	18.0	27.3	17.3	14.8	18.4	14.5	13.0	9.0	8.3	18.4
Potassium	272	256	297	261	288	225	293	191	270	157	146
Selenium	1.14	<0.50	1.24	<0.50	0.72	0.96	0.68	0.90	0.49	0.74	0.76
Silver	1.29	1.75	1.13	1.60	1.39	2.48	1.27	1.39	0.85	0.75	1.54
Sodium	195	240	400	135	150	180	205	150	120	180	150
Thallium	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vanadium	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Zinc	19.7	17.0	19.7	18.9	17.7	20.6	22.4	28.2	22.2	17.8	12.6

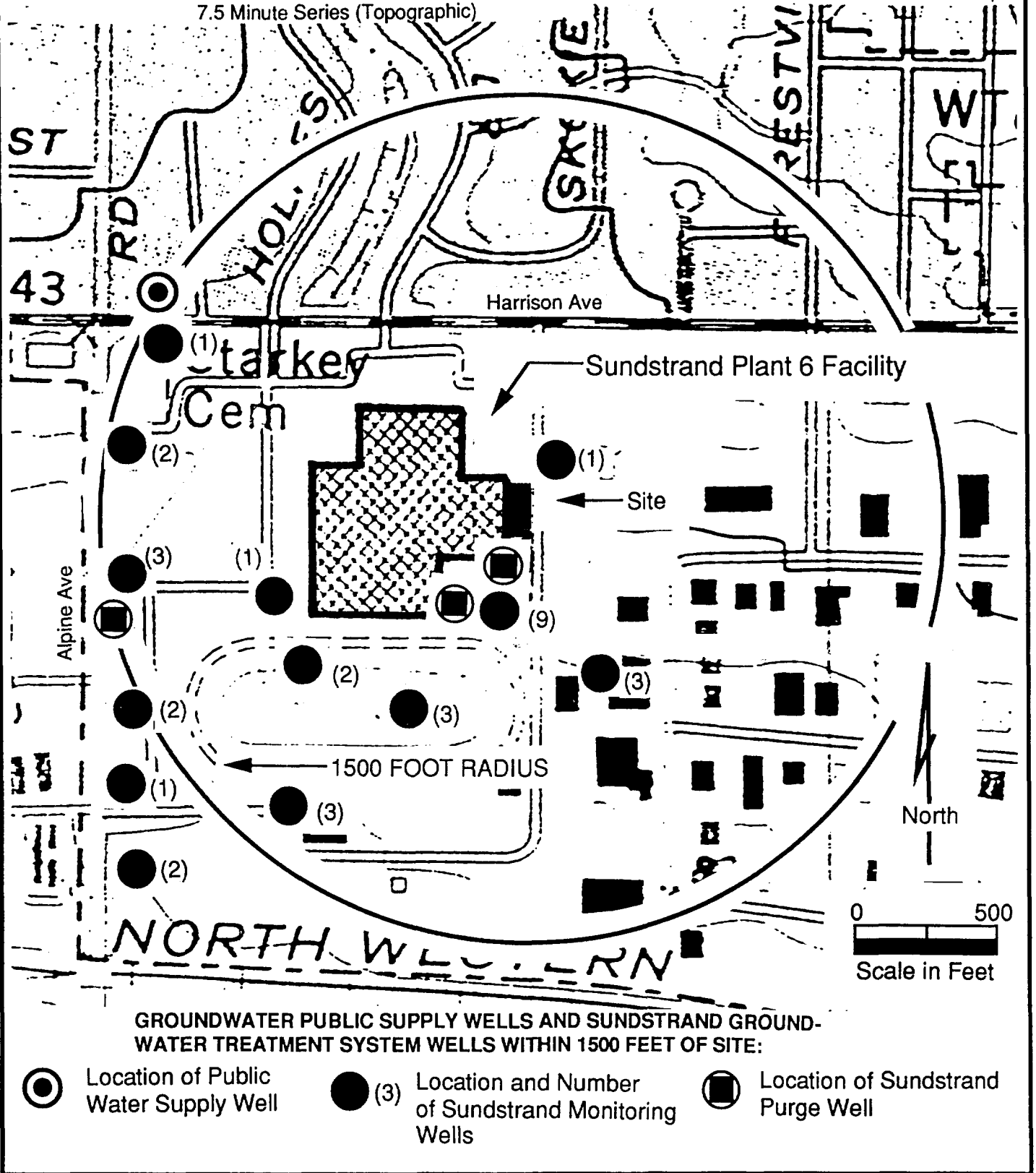
Notes: Chemical concentrations expressed in micrograms per gram

TABLE 3
ESTIMATED MAXIMUM POSSIBLE CONCENTRATIONS OF PCE AND TCA IN GROUNDWATER
SUNDSTRAND PLANT 6 TANK FARM AREA

Soil Boring	Maximum Concentration of PCE in Soil	Kd PCE	Maximum Possible Concentration PCE in Groundwater	Maximum Concentration of TCA in Soil	Kd TCA	Maximum Possible Concentration TCA in Groundwater
SB-1	18	364	0.05	130	152	0.86
SB-2	7.7	364	0.02	ND	152	ND
SB-3	29	364	0.08	ND	152	ND
SB-4	170	364	0.47	100	152	0.66
SB-6	31	364	0.09	30	152	0.20
SB-7	1600	364	4.40	960	152	6.32
SB-8	53	364	0.15	21	152	0.14
SB-9	31	364	0.09	34	152	0.22
SB-10	81	364	0.22	46	152	0.30
SB-11	ND	364	ND	15	152	0.10
SB-12	5.8	364	0.02	7.2	152	0.05
SB-13	9.7	364	0.03	29	152	0.19

- Notes:
1. $K_d = K_{oc} \cdot f_{oc}$, where K_d = distribution coefficient, K_{oc} = organic content adsorption content, and f_{oc} = organic carbon content of soil
 2. $K_{oc} \text{ PCE} = 364$, $K_{oc} \text{ TCA} = 152$, and $f_{oc} = 1.0$
 3. Soil concentrations expressed in ug/kg; Groundwater concentrations expressed in ug/L
 4. Calculations of maximum possible concentrations of PCE and TCA are based on a worst-case scenario where groundwater is in direct contact with the soil where analytical data was obtained. Soils containing chemicals at the Site are not known to be in direct contact with groundwater.

Source Reference: USGS Rockford South Quadrangle, Illinois
7.5 Minute Series (Topographic)



Harding Lawson Associates
Engineering and
Environmental Services

Vicinity Map
Sundstrand Plant 6 Facility
Rockford, Illinois

Figure

1

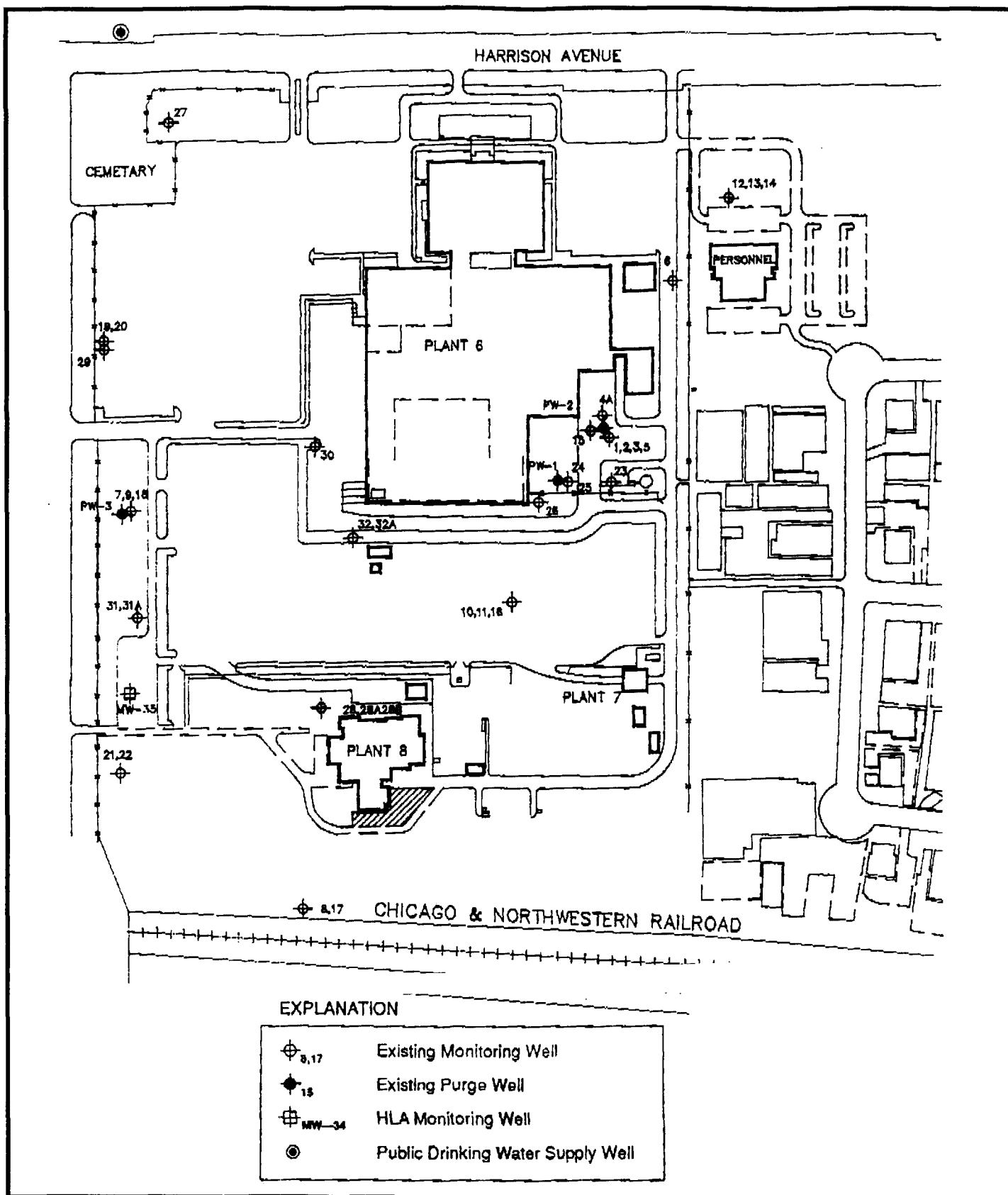
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Groundwater Remediation System
Sundstrand Plant 6 Facility
Rockford, Illinois

Plate

3

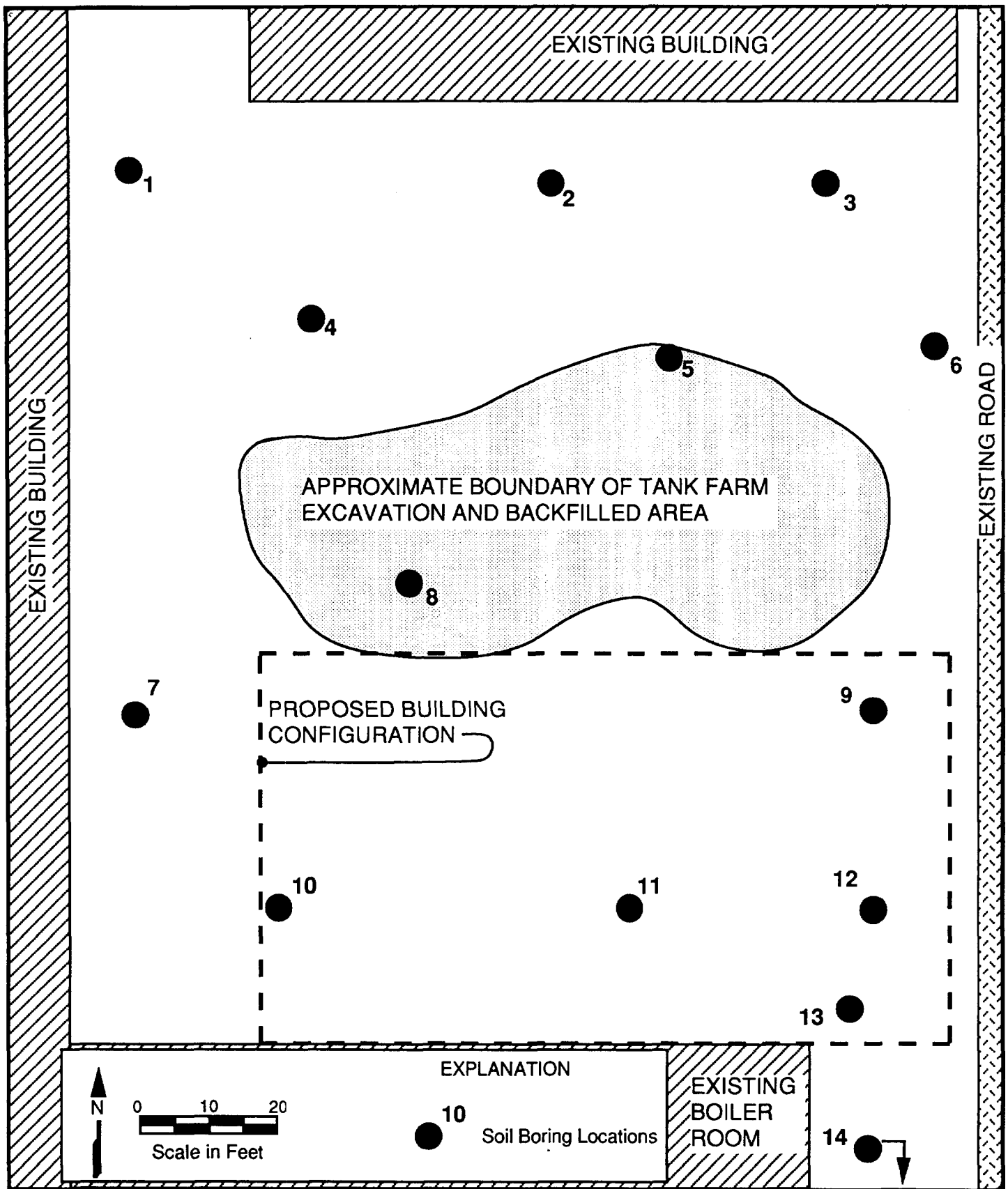
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Boring Location Map
Tank Farm Area Soil Investigation
Sundstrand Plant 6 Facility
Rockford, Illinois

Figure

2

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2/91

REVISED DATE

3. Not applicable. At the time of this submission we do not suspect any free product will be found.
4. This data is not available.
5. Tank integrity tests are enclosed.
6. Following is an outline of steps to determine scope of contamination and a time table for those steps:
 - I. Excavation and removal of leaking underground storage tanks.
 - a) Complete by 7/23/90
 - II. Visual inspection of the excavation and an HNU meter will be used to determine if additional sampling other than those listed in Item III, below, is necessary. If necessary samples will be collected at surface level.
 - a) Conduct 7/23-24/90
 - III. Three grab samples of surface soil at the bottom of the excavation will be taken and sent to a laboratory to determine if product is present. Analysis for stoddard solvent and petroleum products will be conducted.
 - a) Collect Samples 7/23-24/90
 - b) Analytical results 8/13/90
 - IV. If results indicate contamination, soil will be excavated until uncontaminated soil is attained or it is economically or mechanically impractical (at that time other means of remediation will be evaluated).
 - a) Soil excavation 9/4/90

A site map is included in the attachments.

7. Following is a list of contractors whose services have been or will be secured to perform the remediation:

International Piping Systems
9329 Bernice Avenue
P. O. Box 2100
Schiller Park, IL 60176

Illinois Environmental Protection Agency

Page 3

July 14, 1990

Rockford Blacktop
600 Boylston St.
Loves Park, IL 61130

TMT Transport
3210 East 211th Street
Lynwood, IL 60411

NET Midwest, Inc.
3548 35th Street
Rockford, IL 61109

and/or

CBC Environmental Services
140 East Ryan Road
Oak Creek, WI 53154

If you have any questions or require additional information, please
contact me at (815) 226-6934.

Sincerely,



Al Munn, Environmental, Health and
Safety Manager

AM:cw

Copy: Illinois State Fire Marshal
Underground Storage Tank Section
1035 Stevenson Drive
Springfield, IL 62703

Illinois Emergency Services and Disaster Agency
110 East Adams Street
Springfield, IL 62706

Linda Aylward
Corporate Law Office

Mark Chiado
Corporate Loss Control

Complete this form.

**Contingency Plan
Leaking Underground Storage Tank Problems**

City Rockford Incident # 901617
Site Name Sundstrand ATG
Address 4747 Harrison Ave.
Rockford, Illinois
Site Phone (815) 226-6000

Person representing the site with authority to approve remediation expenditures in an emergency

Al Munn
Phone (815) 226-6000
After-hours Phone (815) 226-6000

Contractor Hired for Tank Removal International Piping Systems
Phone (708) 671-7725
After-hours Phone Same

Contractor Available for Emergency Response Same
Phone _____
After-hours Phone _____

In case of Additional Petroleum Product spillage or discovery of products or vapors in the
Sewers, Streams, and/or Buildings **IMMEDIATELY** Notify all the Following:

Local Fire Department Rockford Fire Dept. Phone (815) 964-3321

Local Police Department Rockford Police Dept Phone (815) 987-5800

Sewer Authority Rock River Reclam. District Phone (815) 397-9700
After-Hours Phone (815) 397-9422

Illinois Emergency Services and Disaster Agency and ask for the IEPA Duty Officer
Phone 800/782-7860

Confirm that the emergency contractor is available and willing to respond to this site. Then post the original
in a prominent place for your employees and send the carbon to:

IEPA-ERU #29
2200 Churchill Road
Post Office Box 19276
Springfield, Illinois 62794-9276

Illinois Environmental Protection Agency — Emergency Response IEPA-ERU
Phone 217/782-3637

Leak Computer - Quick Look Report Leak Computer - Quick Look Report
(PAGE 1) (PAGE 2)

Test Number: B9042190.A72

Test Number: B9042190.A72

FDR: 18888 gal. WASTE/WATE Tank
LOCATION: SUNSTRAND 4747 HARRISON AVE. ROCKFORD IL
DATE OF TEST: 04/21/89
LEAK COMPUTER S/N: 88102502

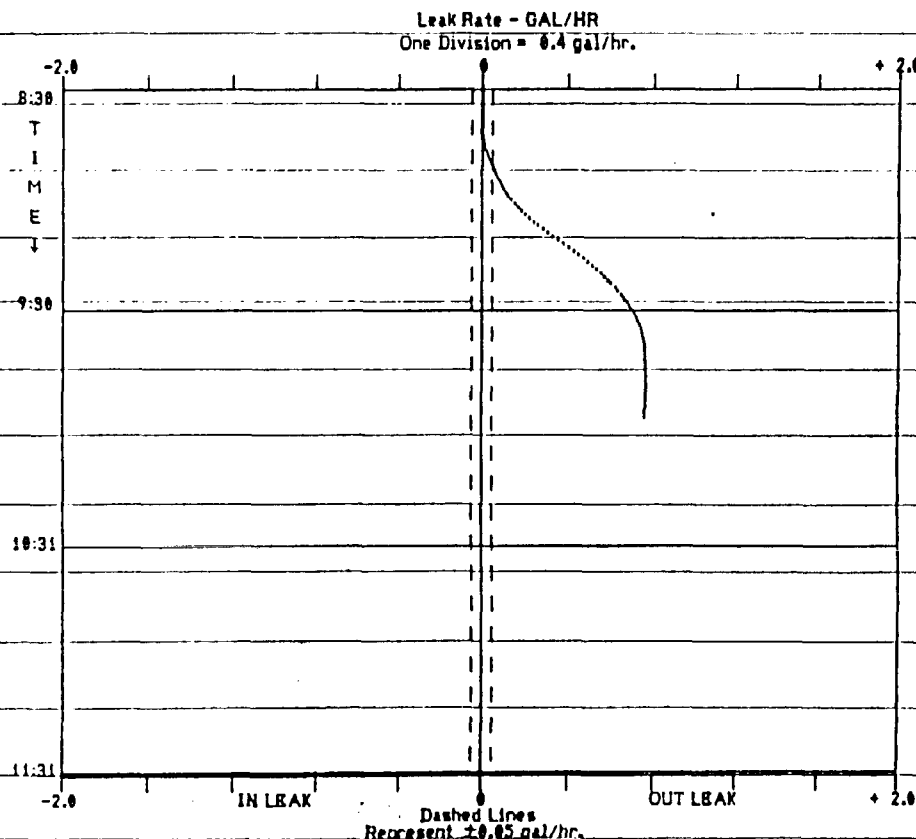
Test Level 72 inches ABOVE Tank Top
Data from Channel A
Manifolding: None
COE: 0.000115 Spec. Gr.: 1.01 Tank Temp: 54.1
Leak Rate Average of 30 Cycles
Total Test Time: 1:20 hours

TEST RESULTS

Final Average Leak Rate: 0.7598 gal/hr.
Rate of Temperature change: 0.0028 °F/hr.
Rate of Volume change: -0.7454 gal/hr.
0.99 Error Bands ± 0.05 gal/hr.
Tank and System: FAIL @ 72 inches ABOVE Tank Top.

Test Technicians

JEFF HILLER



Leak Computer - Quick Look Report (PAGE 1)

Test Number: 89042191.A60

Leak Computer - Quick Look Report (PAGE 2)

Test Number: 89042191.A60

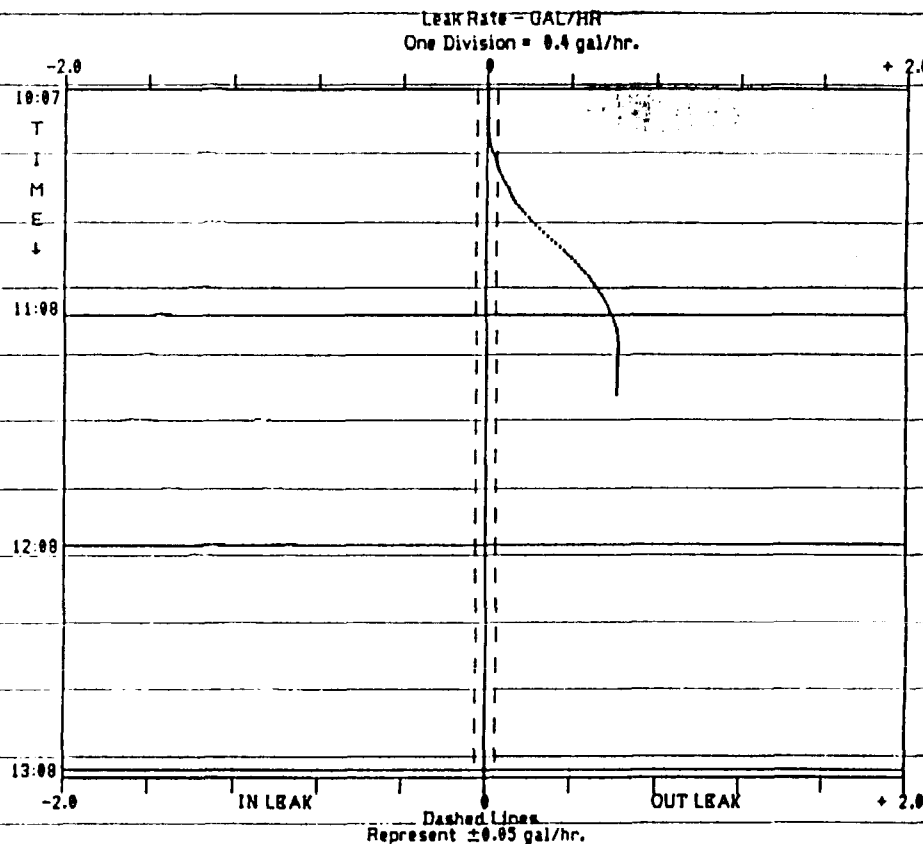
FOR: 10000 gal. WASTE/WATE Tank
 LOCATION: SUNSTRAND 4747 HARRISON AVE. ROCKFORD IL
 DATE OF TEST: 04/21/89
 LEAK COMPUTER S/N: 88102502

Test Level 60 Inches ABOVE Tank Top
 Data from Channel A
 Manifolding: None
 COE: 0.000115 Spec. Gr.: 1.00 Tank Temp: 54.1
 Leak Rate Average of 30 Cycles
 Total Test Time: 1:13 hours

TEST RESULTS

Final Average Leak Rate: 0.6160 gal/hr.
 Rate of Temperature changes: 0.0045 °F/hr.
 Rate of Volume changes: -0.6026 gal/hr.
 0.99 Error Bands ± 0.08 gal/hr.
 Tank and System: FAIL at 60 Inches ABOVE Tank Top.

Test Technicians: JEFF HILLER



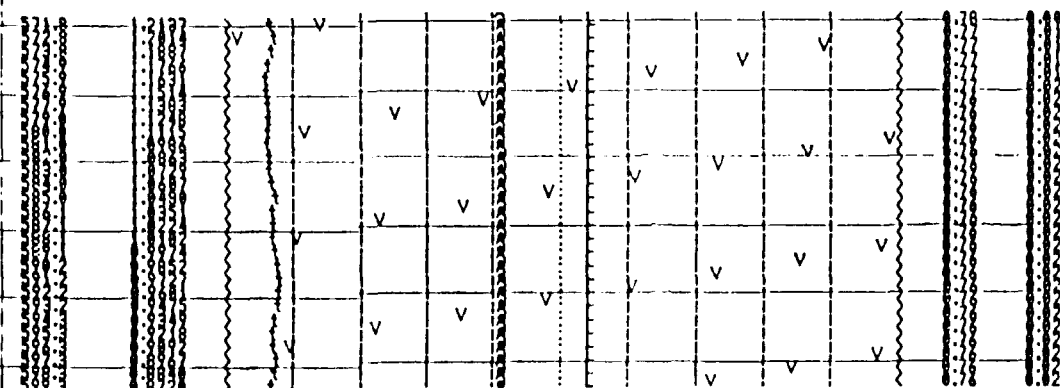
STRIP CHART FOR DATA RECORD: 89042190.A72 OF 10000 GALLON WASTE/WATE TANK

Test Address: SUNSTRAND 4747 HARRISON AVE. ROCKFORD IL

Test Operator: JEFF HILLER

LEAK RATE AVG OF 30 CYCLES TANK TEMP @ START: 54.1 F
COE: 0.000115 DEN: 1.011 LFD: 6.0 Manifolding: None

TIME GAL <----- 2 = 10.0F -----> AVG THREE
<----- t = 0.1 F -----> LEAK STD
<----- U = 0.1 gal -----> RATE DEV



END OF STRIP CHART
DATA COLLECTED ON LEAK COMPUTER SN 88102502

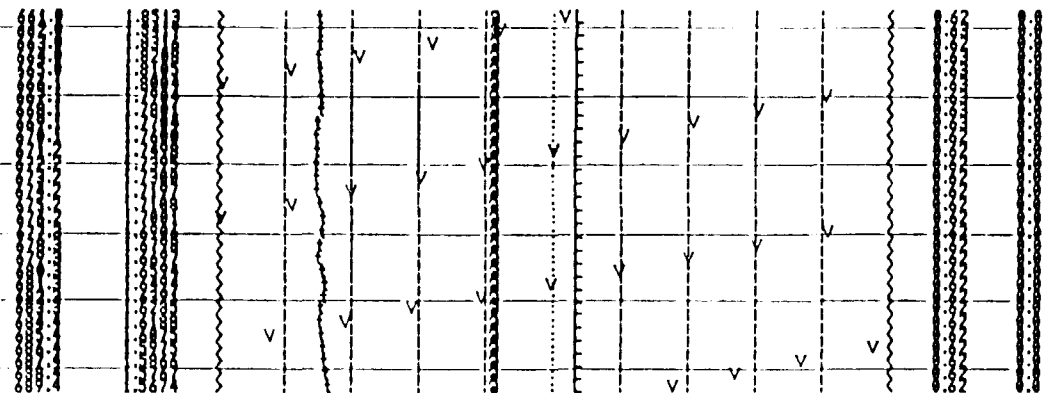
STRIP CHART FOR DATA RECORD: 89042191.A60 OF 10000 GALLON WASTE/WATE TANK

Test Address: SUNSTRAND 4747 HARRISON AVE. ROCKFORD IL

Test Operator: JEFF HILLER

LEAK RATE AVG OF 30 CYCLES TANK TEMP 2 START: 54.1 F
COE: 0.000115 DEN: 1.002 LFD: 6.0 Manifolding: None

TIME GAL <----- 2 = 10.0F -----> AVG THREE
<----- t = 0.1 F -----> LEAK STD
<----- U = 0.1 gal -----> RATE DEV



DATA COLLECTED ON LEAK COMPUTER SN 88102502

Leak Computer - Quick Look Report Leak Computer - Quick Look Report

(PAGE 1)

(PAGE 2)

Test Number: 89041876.899

Test Number: 89041876.899

FOR: 10000 gal. STODDARD Tank
LOCATION: SUNSTRAND 4747 HARRISON ROCKFORD IL 6112
DATE OF TEST: 04/18/89
LEAK COMPUTER S/N: 88102502

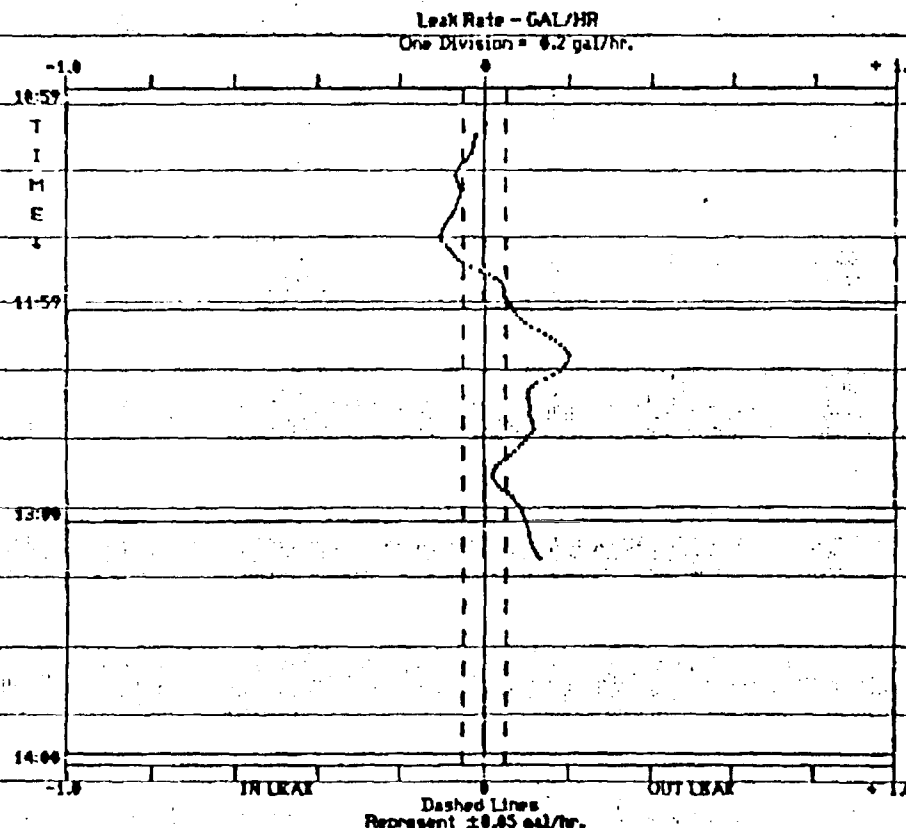
Test Level: 99 inches ABOVE Tank Top
Data from Channel B
Manifolding: None
COEs: 0.000503 Spec. Gr.: 0.81 Tank Temp: 54.9
Leak Rate Average of 30 Cycles
Total Test Time: 1:55 hours

TEST RESULTS

Final Average Leak Rates: 0.1310 gal/hr.
Rate of Temperature change: 0.0081 °F/hr.
Rate of Volume change: -0.1754 gal/hr.
0.99 Error Bands ± 0.10 gal/hr.
Tank and System: FAIL @ 99 inches ABOVE Tank Top.

Test Technician:

JEFF HILLER



Leak Computer - Quick Look Report

(PAGE 1)

Test Number: 89041878.874

Leak Computer - Quick Look Report

(PAGE 2)

Test Number: 89041878.874

Leak Rate - GAL/HR
One Division = 0.2 gal/hr.

OR: 10800 gal. STODDARD Tank

13:35

LOCATION: SUNSTRAND #747 HARRISON ROCKFORD IL 6112

DATE OF TEST: 04/18/89

LEAK COMPUTER SN: 00102502

Test Level 74 inches ABOVE Tank Top

14:36

Data from Channel 8

Manifolding: None

CUET 0.000503 Spec. Ur. 8.81 Tank Temp: 54.9

Leak Rate Average of 30 Cycles

Total Test Time: 1:06 hours

TEST RESULTS

15:36

Final Average Leak Rate: 0.2458 gal/hr.

Rate of Temperature change: 0.0468 °F/hr.

Rate of Volume change: -0.0961 gal/hr.

0.99 Error Band: ± 0.04 gal/hr.

Tank and System: FAIL 2 74 inches ABOVE Tank Top.

Test Technician:

JEFF MILLER

16:37

IN LEAK

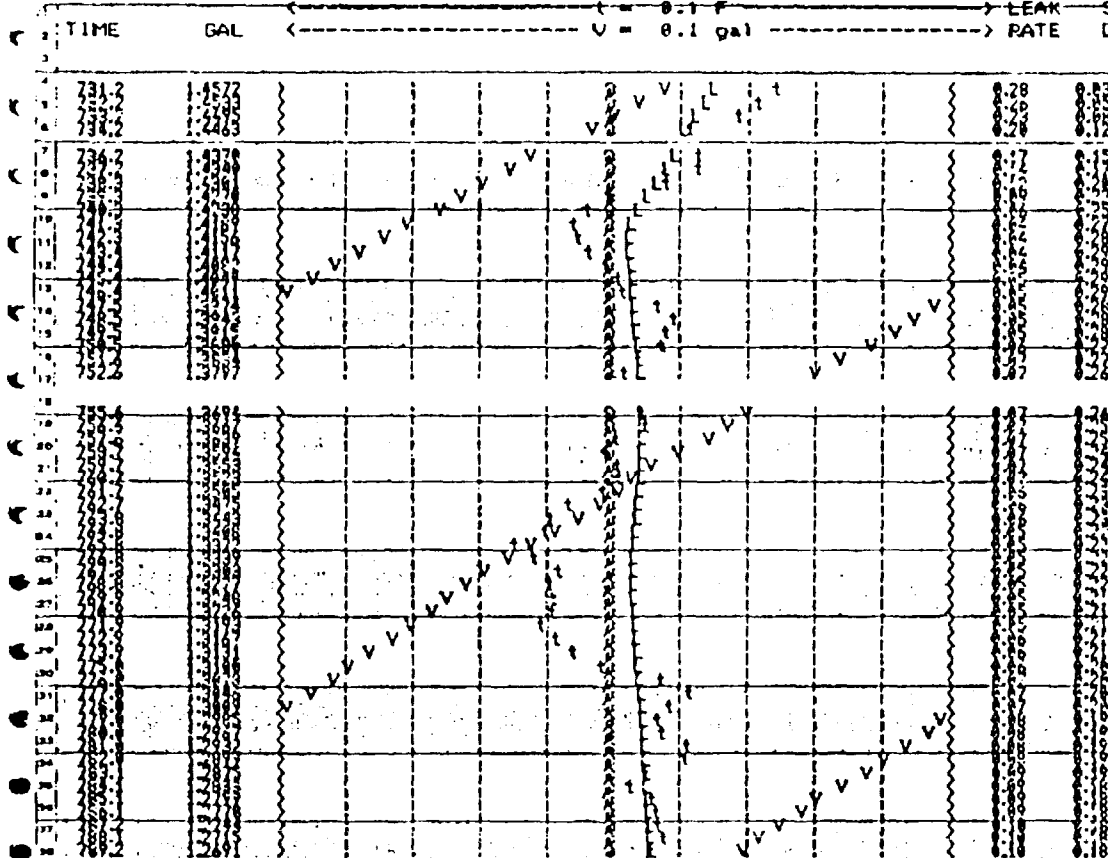
OUT LEAK

Dashed Lines
Represent ±0.05 gal/hr.

MAY-23-89 TUE 15:03 J.N. DAVEY&ASSOC

LEAK RATE AVG OF 60 CYCLES TANK TEMP 2 START: 54.9 F
COE: 0.000503 DEN: 0.814 LFD: 6.0 Manifolding: None

~~<----- 2 = 10.8F -----> AVG THREE~~
~~<----- 1 = 0.1 F -----> LEAK STD~~
~~<----- V = 0.1 gal -----> RATE DEV~~



END OF STRIP CHART
DATA COLLECTED ON LEAK COMPUTER SN 80102502

STRIP CHART FOR DATA RECORD: 89841878.874 OF 18889 GALLON STODDARD TANK

Test Address: SUNSTRAND 4747 HARRISON ROCKFORD IL 6112

Test Operator: JEFF MILLER

LEAK RATE AVG OF 30 CYCLES TANK TEMP 2 START: 54.7 F
COE: 0.008583 DEN: 0.812 LFD: 6.0 Manifolding: None

TIME GAL <----- 2 = 10.0F -----> AVG THREE
<----- t = 0.1 F -----> LEAK STD
<----- U = 0.1 gal -----> RATE DEV

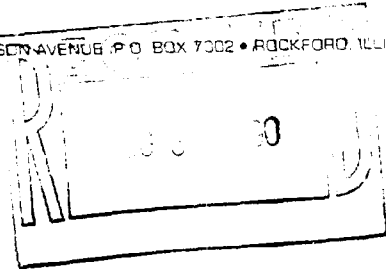
END OF STRIP CHART
DATA COLLECTED ON LEAK COMPUTER SN 88182502

Sundstrand Advanced Technology Group

Sundstrand Corporation



4747 HARRISON AVENUE, P.O. BOX 7002 • ROCKFORD, ILLINOIS 61125-7002 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 25-7440



August 31, 1990
EPA90-086

Illinois Environmental Protection Agency
Division of Land Pollution Control
Leaking Underground Storage Tank Section
2200 Churchill Road
P.O. Box 19276
Springfield, IL 62706

RE: Sundstrand ATG, Rockford IL
Winnebago County
Incident #901937

Dear Sir:

Following is our response to your form letter which we received on July 23, 1990, requesting additional information on our reported release (7/12/90) of Waste Water and Oil.

1. After a heavy rainfall, the 10,000 gallon waste water and oil tank filled beyond capacity, causing the tank to overflow at the manway access into a concrete retainment area. This retainment area is saddled over the top of the tank manway access. It is constructed of four concrete walls and fitted with a steel cover. The top of the tank and backfill serve as the retainment floor. Waste water and oil flowed out of the tank into the retainment area and may have escaped beneath the concrete retaining walls. Quantity of release unknown.
2. See Attachment No. 1.
3. Not available at this time. Proposed soil borings are indicated on Attachment No. 1.
4. Not available at this time.
5. Samples have not yet been collected. When a plan is available it will be forwarded to the address indicated at the top of this letter.
6. See enclosed Attachment 2.

In addition to the above:

1. Waste water and oil were pumped from the tank to lower the level of waste in the tank. All stained backfill was removed from retainment area immediately following the release.
2. See additional number 1 above.
3. Not applicable.
4. Not applicable at this time.
5. A sample plan will be forwarded to the address indicated at the top of the letter once developed. Soil will be analyzed for products contained in this tank.
6. Not applicable. At the time of this submission, we do not suspect any free product will be found.

If you have any questions or require additional information, please contact me at (815) 226-6934.

Sincerely,



Al Munn
Environmental, Health
and Safety Manager

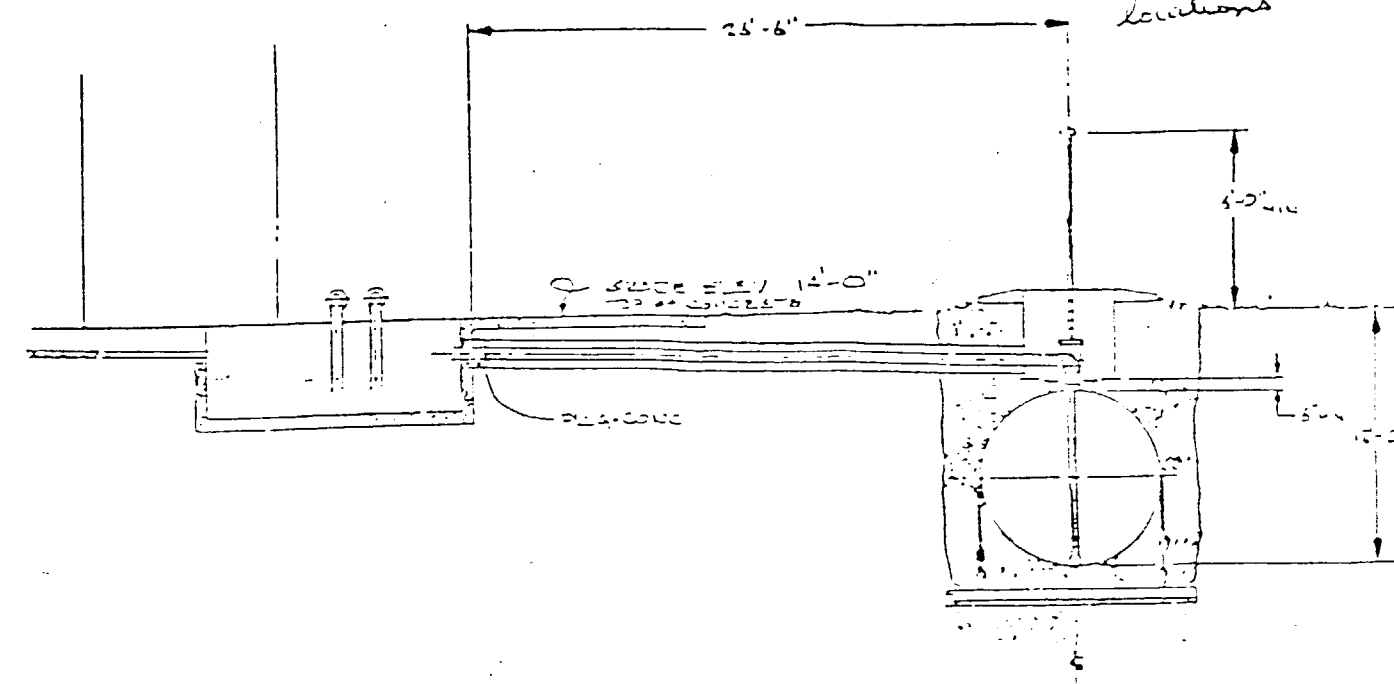
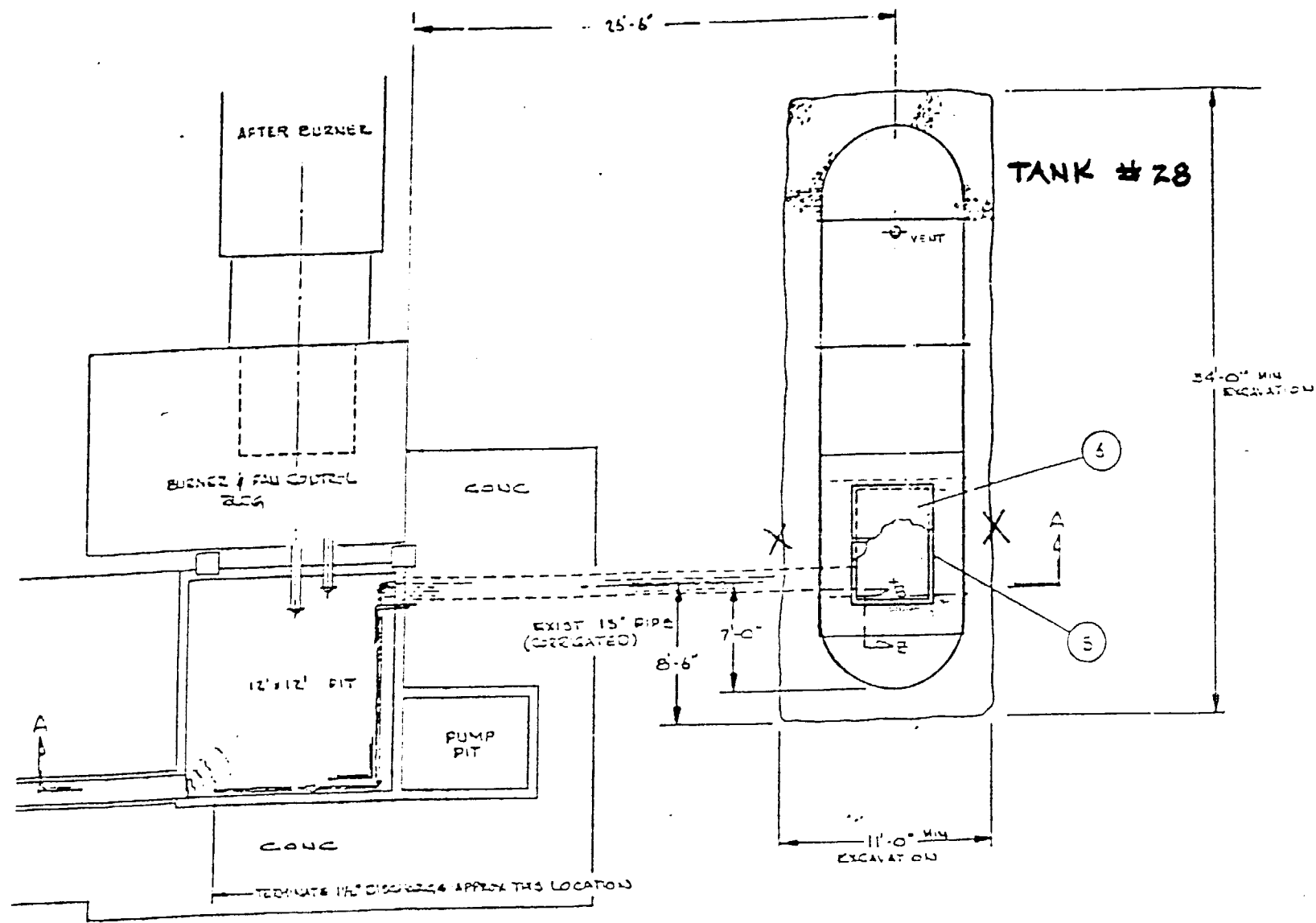
AM:ns1

cc: Illinois State Fire Marshal
UST Section
1035 Stephenson Drive
Springfield, IL 62703

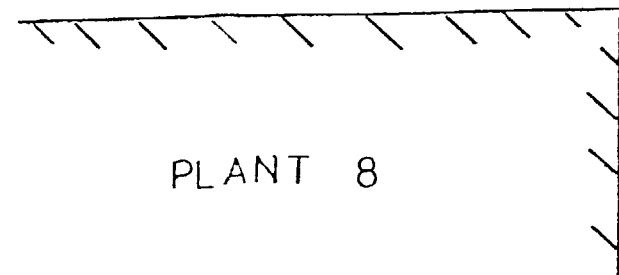
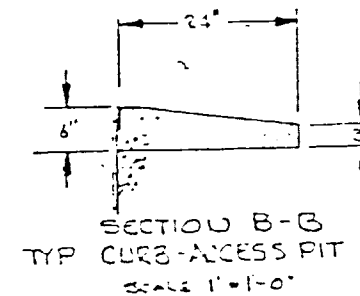
Illinois ESDA
110 East Adams Street
Springfield, IL 62076

Linda Aylward
Corporate Law Office

Bob Miller
Corporate Loss Control

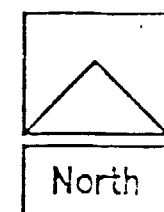
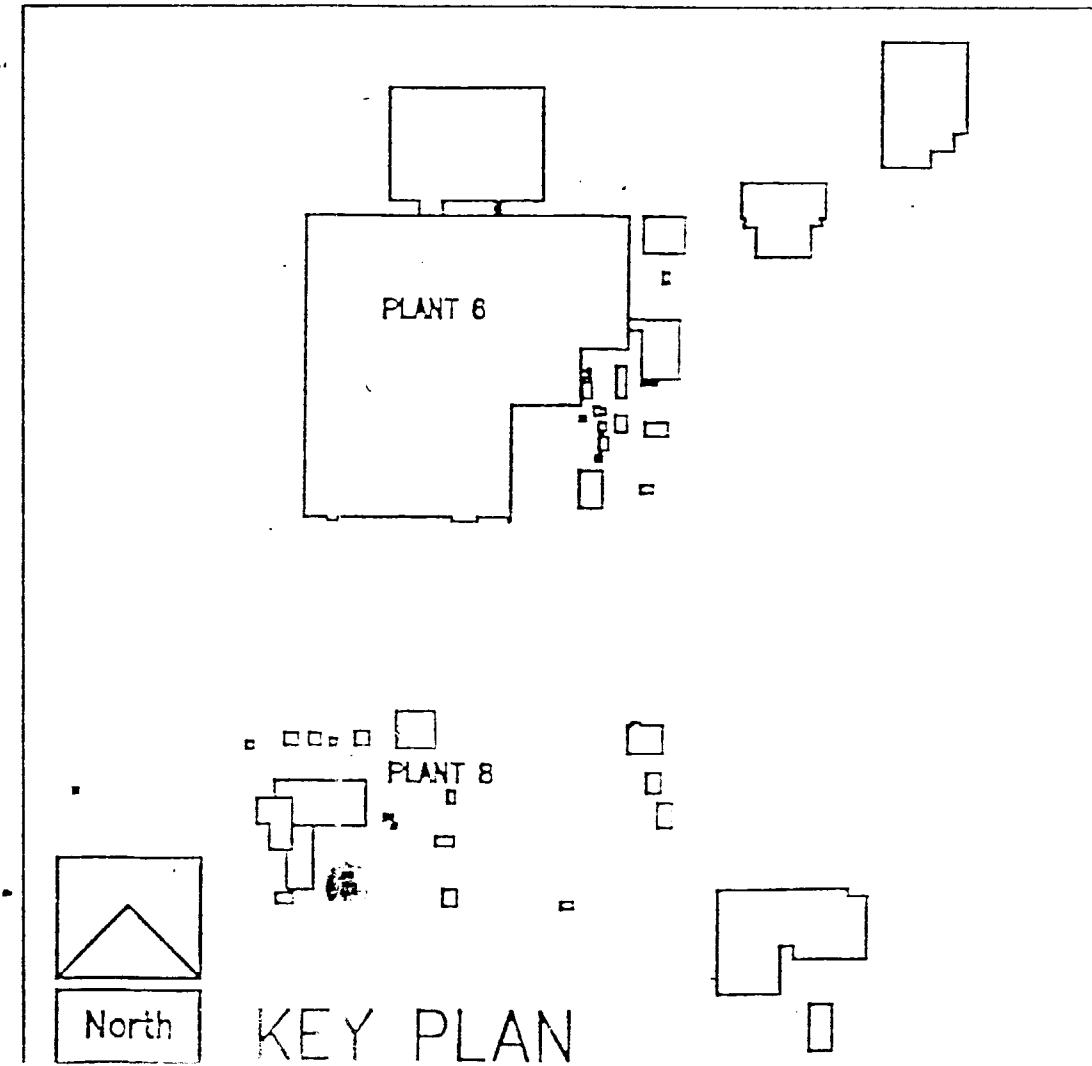
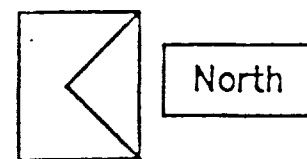


SECTION A-A



PLANT 8

PLANT 8
WASTE WATER TANK



KEY PLAN

Inspection Number

PLANT 8 WASTE WATER TANK (#28)

1. Photo ID Number

NEG. #13

2. Date/Time

JULY 12, 1990

Location (Photo and Photographer)

ABOVE CONCRETE RETAINMENT AREA

LOOKING EAST.

Description

PIPING INLET TO CONCRETE RETAINMENT AREA. NOTE "CONTAMINATED" PEA GRAVEL BEING SHOVELED INTO BUCKET AND REMOVE.

8. ☐ Confidential Materials

Cont.

1. Photo ID Number

NEG. #14

2. Date/Time

JULY 12, 1990

6. Location (Photo and Photographer)

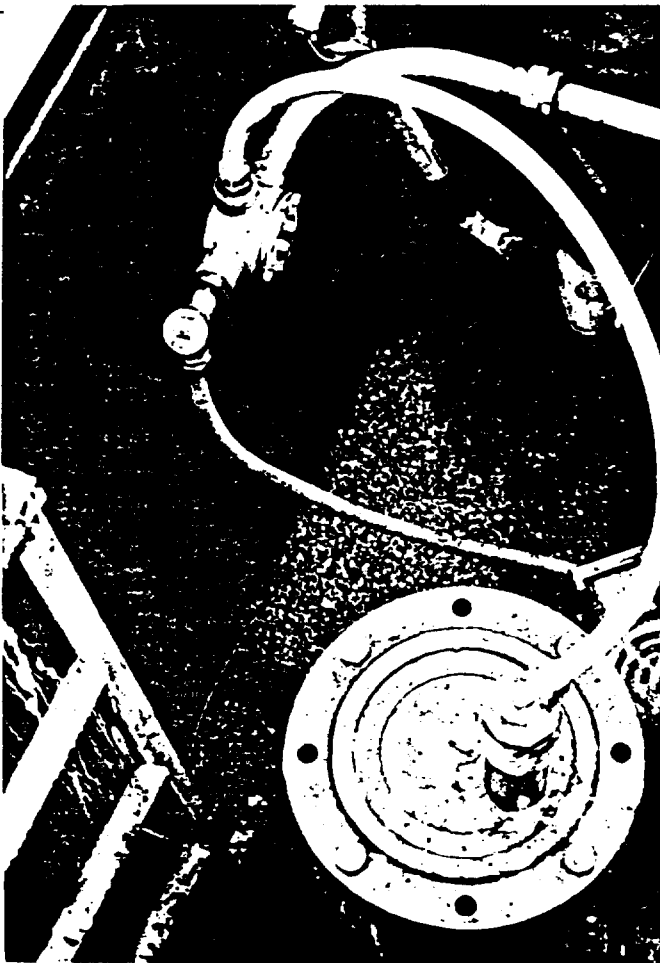
ABOVE CONCRETE RETAINMENT AREA
LOOKING WEST.

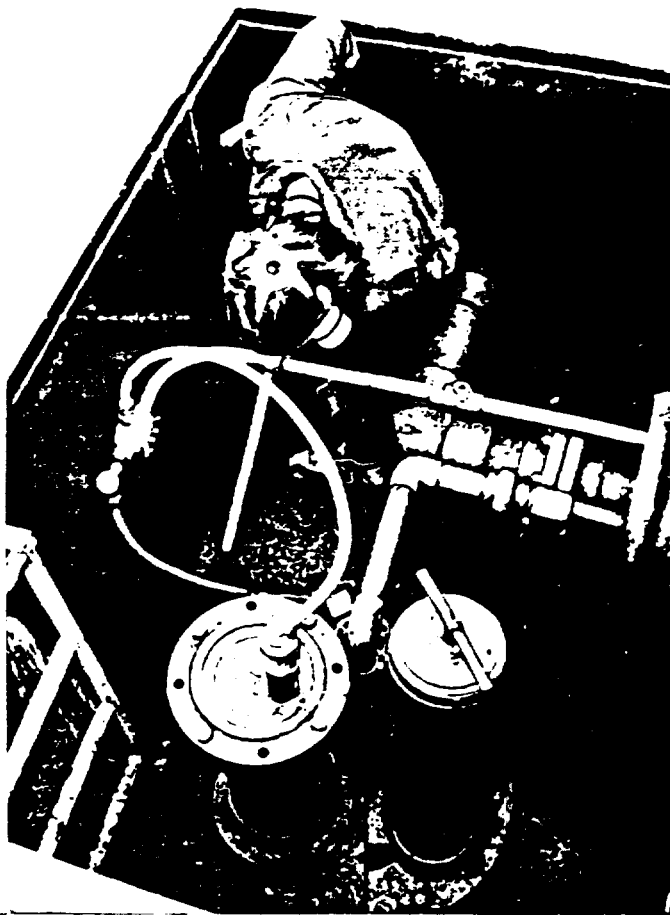
7. Description

"BOTTOM" OF CONCRETE RETAINMENT AREA. NOTE "CLEAN" FILL GRAVEL ENTERING RETAINMENT AREA.

8. ☐ Confidential Materials

Cont.





Inspection Number

PLANT 8 WASTE WATER TANK (#28)

1. Photo ID Number

NEG. #15

2. Date/Time

JULY 10, 1990

3. Location (Photo and Photographer)

ABOVE CONCRETE RETAINMENT AREA

LOOKING WEST.

7. Description

CLEAN-UP OF "CONTAMINATED" GRAVEL
ON BOTTOM OF CONTAINMENT AREA.

NOTE "CLEAN" GRAVEL ENTERING
CONTAINMENT AREA FROM OUTSIDE OF
CONTAINMENT WALL.

8. ☐ Confidential Materials

Cont.

1. Photo ID Number

NEG. #16

2. Date/Time

JULY 10, 1990

3. Location (Photo and Photographer)

ABOVE CONCRETE RETAINMENT AREA

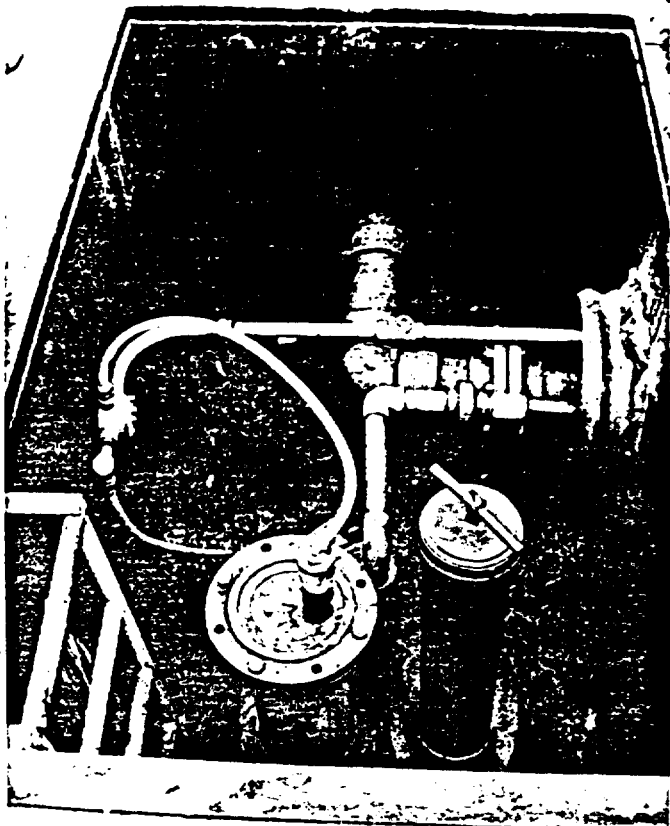
LOOKING WEST.

7. Description

SAME AS ABOVE.

8. ☐ Confidential Materials

Cont.



Complete this form.

**Contingency Plan
Leaking Underground Storage Tank Problems**

City Rockford Incident # 901937
Site Name Sundstrand ATG
Address 4747 Harrison Ave.
Rockford, Illinois
Site Phone (815) 226-6000

Person representing the site with authority to approve remediation expenditures in an emergency

Al Munn
Phone (815) 226-6000
After-hours Phone (815) 226-6000

Contractor Hired for Tank Removal Not Applicable at this time
Phone _____
After-hours Phone _____

Contractor Available for Emergency Response Not Applicable at this time
Phone _____
After-hours Phone _____

In case of Additional Petroleum Product spillage or discovery of products or vapors in the
Sewers, Streams, and/or Buildings **IMMEDIATELY** Notify all the Following:

Local Fire Department Rockford Fire Dept. Phone (815) 964-3321

Local Police Department Rockford Police Dept. Phone (815) 987-5800

Sewer Authority Rock River Reclam. District Phone (815) 397-9700
After-Hours Phone (815) 397-9422

Illinois Emergency Services and Disaster Agency and ask for the IEPA Duty Officer
Phone 800/782-7860

Confirm that the emergency contractor is available and willing to respond to this site. Then post the original
in a prominent place for your employees and send the carbon to:

IEPA-ERU #29
2200 Churchill Road
Post Office Box 19276
Springfield, Illinois 62794-9276

Illinois Environmental Protection Agency — Emergency Response IEPA-ERU
Phone 217/782-3637

HAZARDOUS MATERIAL INCIDENT REPORT

1. NAME AND PHONE NUMBER OF CALLER

GREG HOLTAPP

6942

2. COMPANY NAME AND ADDRESS:

SUNDSTRAND ATG

4747 HARRISON AVE

3. PLANT, DEPARTMENT AND BAY LOCATION:

Plant #6

578

COOLING TOWER

4. TIME INCIDENT STARTED:

11:30 AM

STOPPED:

12:15 PM

5. DESCRIPTION OF INCIDENT: (INCLUDE NAME OF MATERIAL(S) INVOLVED:

SULFURIC ACID

6. VOLUME IN GALLONS:

10

7. ACID ☒

CAUSTIC ☐

FLAMMABLE ☐

REACTIVE ☐

8. WERE THERE INJURIES: NO ☒

YES ☐

EXPLAIN: _____

9. DID OR IS SPILL ENTERING:

STORM SEWER: NO ☒

YES ☐

LOCATION: _____

SANITARY DISTRICT: NO ☒

YES ☐

LOCATION: _____

10. SPILL CATEGORY: A _____ B _____ C ☒ D _____ X _____
(REFER TO TABLE II)

11. WAS THERE AN EXPOSURE TO HUMAN HEALTH: NO ☒

YES ☐

EXPLAIN: MINIMAL AMOUNT IMMEDIATELY FLUSHED W/ H₂O

CREATORS KEPT UPWIND OF SPILL.

12. WAS THERE AN EXPOSURE TO THE ENVIRONMENT: NO ☐

YES ☒

EXPLAIN: RIN OFF METAL SILIC PLATE

13. DESCRIBE THE DISPOSITION OF THE RECOVERED HAZARDOUS MATERIAL: (INCLUDE QUANTITY OF RECOVERED MATERIAL)

NEUTRALIZED WITH CRUSHED LIMESTONE AND WATER.

SIGNATURE:

Jeff A. Lindstrom

SIGNATURE:

R. Munn 6/3/89

CALL LIST

	<u>DURING HOURS</u>	<u>AFTER HOURS</u>
✓ Al Munn	6939	229-1043
✓ Jeff Lindstrom	5241	229-5341
✓ Jack Johnson	6933	399-7039
✓ Jim Eckroth	6718	1-874-1825
Dick Johnson	6940	398-5796
✓ Corporate Loss Control	6353	-----

SANITARY DISTRICT OF ROCKFORD
ACCIDENTAL DISCHARGE REPORTING FORM

This form must be completed and returned to the District Director within fifteen (15) days following the report of an accidental or deliberate discharge to the sanitary sewer. Completion of this form is a requirement of Ordinance 361 (Article IV, Section 10C) and does not relieve the User of any liabilities due to the accidental discharge. Prompt and accurate reporting does reflect that the User is attempting to address the problem.

Company Name: Sundstrand Aviation

Address: 4747 Harrison Ave. Phone: 226-6000

Person completing this form: Al Munn

Title: Environmental Analyst

Time and Date accidental discharge started and stopped:

Started 10:00 ~~am~~ on March 15, 1984 (date) and

stopped 10:00 ~~am~~ on March 15, 1984 (date).

Type of material spilled: Silver Cyanide Solution

Volume of spill (give units): approximately 2 quarts diluted by up to 2 gallons water.

Chemical analysis of a representative sample of the spilled material. Show concentration of all compounds in the spilled material. If a sample of the spilled material is not available, list all known contents present in the discharged material.

COMPOUND	CONCENTRATION (mg/l)
Cyanide	100 ppm

Location of accidental discharge:

Plant process area _____ Material Storage area _____

In-plant transfer area _____ Shipping/Receiving area _____

Other (specify) _____ Materials Lab Storage Room _____

Is spill containment present in the area where the accidental discharge occurred?

Yes _____ No X

Is spill containment present in other areas within the plant?

Yes X No _____

Describe the cause of the reported discharge:

Plastic bottle in which solution was being stored sprung a leak.

Describe what actions were taken at the time to control the spill (eg. sealed floor drain, use of sorbants or foams, etc.):

Bottle was put into a glass beaker, spilled material was washed up into
a gallon pail and sink.

Did the spill receive any type of treatment?

Yes X No _____

If yes, please describe:

Treatment by dilution only

Was any part of the spill contained and prevented from discharge to the sanitary sewer? Yes X No X

If yes, please describe how that waste was disposed.

Entire spill was contained; however, per Dick Eick's (SDR) permission
on 3/15/84, spill was released slowly with water flush to sanitary
sewer.

Describe fully what measures will be taken to prevent similar accidents in the future.

N/A

Anticipated time schedule in which the above-stated measures will be completed.

N/A

This accidental discharge was reported to the District on March 15, 1984(date)

at 10:22 am/~~pm~~ by Al Munn Al Munn (name),

Environmental Analyst (title).

Sundstrand Corporation



CORPORATE OFFICES • 4949 HARRISON AVENUE, P.O. BOX 7003 • ROCKFORD, ILLINOIS 61125-7003 • PHONE (815) 226-6000 • TWX 910-631-4255 • TELEX 25-7440

November 21, 1990

Ms. Elizabeth Doyle
U.S. Environmental Protection Agency
Office of Regional Counsel
111 W. Jackson
Chicago, IL 60604

RE: Southeast Rockford Superfund Site
Meeting For Further Information

Dear Elizabeth:

This is to confirm our meeting with you which has been scheduled for Thursday, November 29 at 10:00 a.m. at the U.S. Environmental Protection Agency (U.S. EPA), 230 South Dearborn, on the 11th floor in the northwest corner. I understand that you, Karen Vendl and Ken Theisen plan to attend this meeting from the U.S. EPA. Robert Miller, William Coole, Linda Aylward and Michael Malley from Harding Lawson Associates will attend on behalf of Sundstrand.

I look forward to meeting with you on the 29th.

Very truly yours,

SUNDSTRAND CORPORATION

Linda Szempruch Aylward
Senior Associate Attorney

LSA/sem

CC: ✓ Karen Vendl - U.S. EPA
Ken Theisen - U.S. EPA
Robert Miller - Sundstrand Corporation
William Coole - Sundstrand Corporation
Michael Malley - Harding Lawson Associates